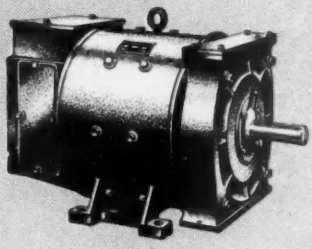
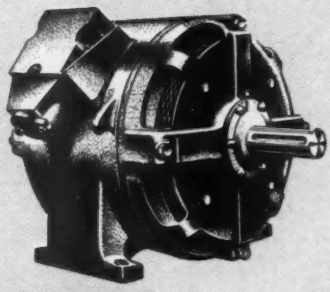
ELECTRICAL TIMES

THURSDAY
23 OCT.
1952
NINEPENCE

They bear the name

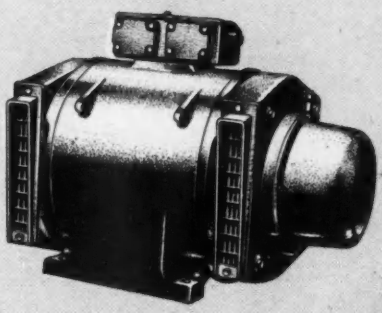


G.E.C.



. . . and a name

for *RELIABILITY*



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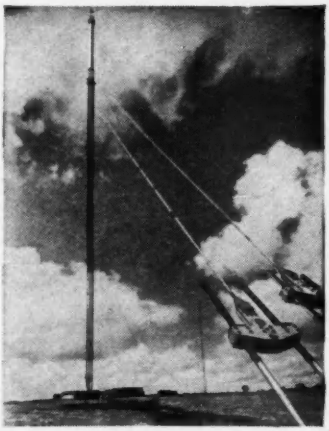

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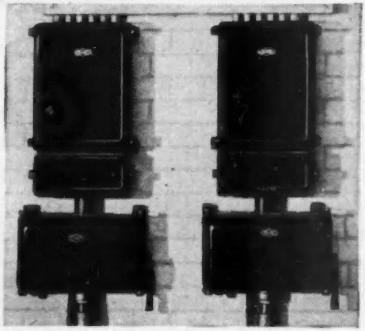

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from the house of Simplex

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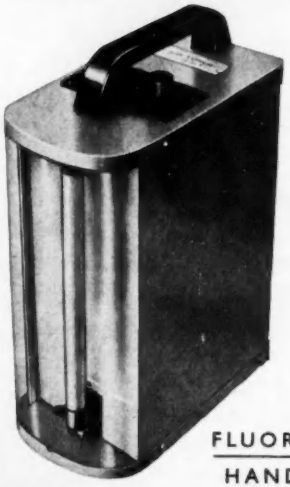

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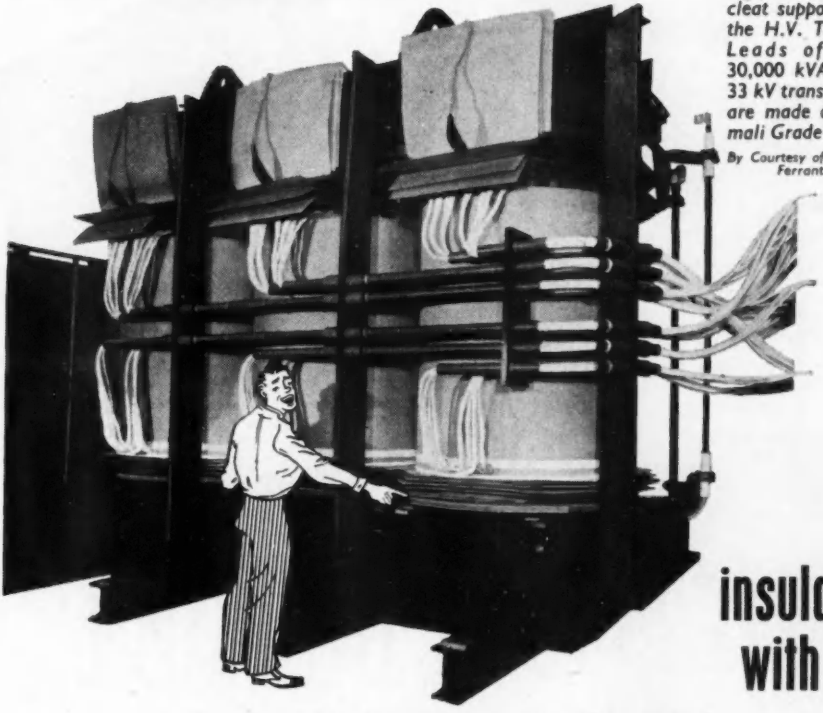

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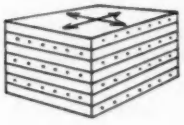

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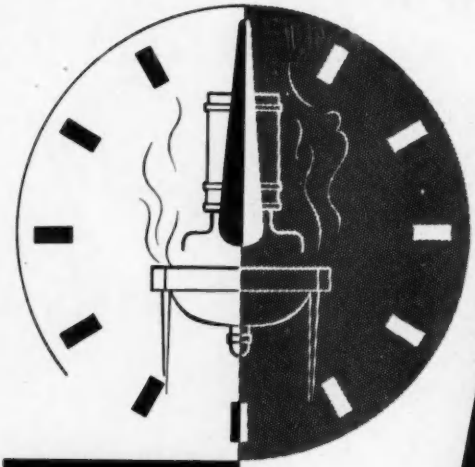

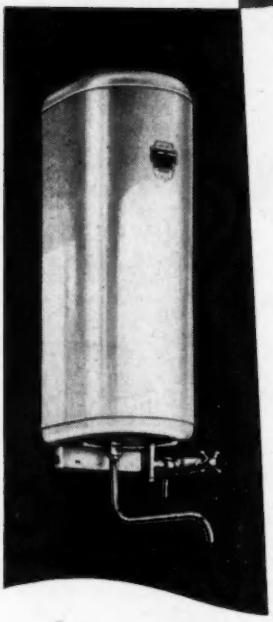

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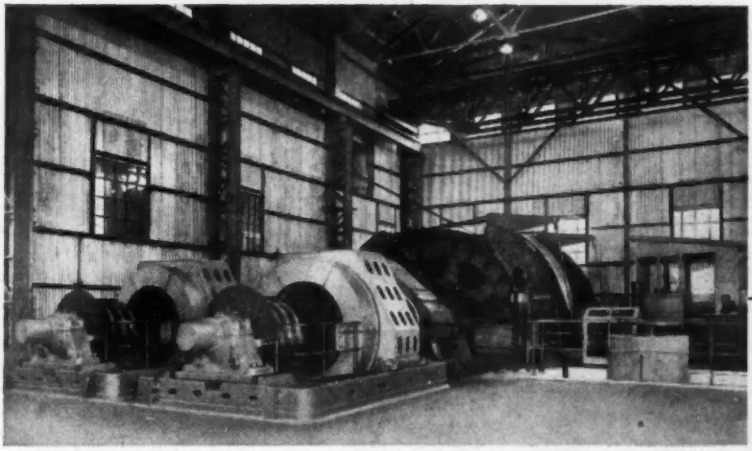
Twin motor A.C. mine hoists



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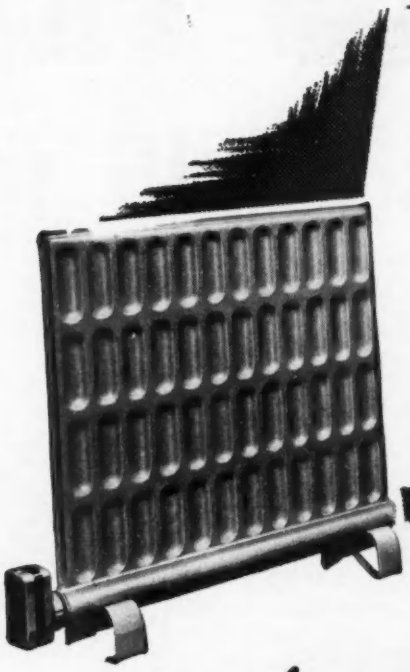

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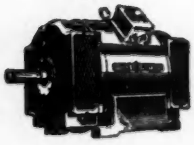
HIGGS MOTORS

A.C.



FROM STOCK

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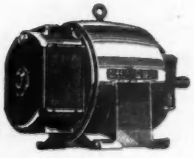

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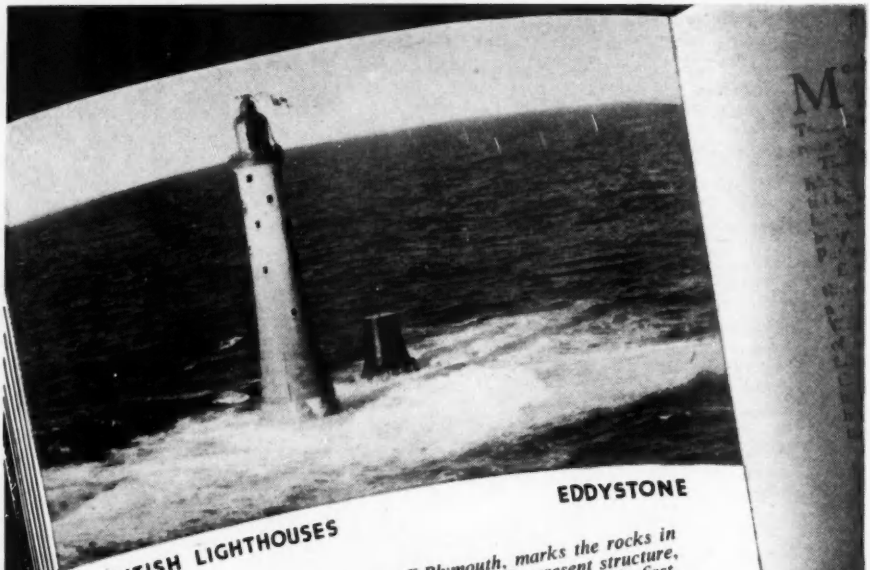

BRITISH LIGHTHOUSES

EDDYSTONE

Eddystone Lighthouse, 14 m. off Plymouth, marks the rocks in the fairway from the Start to the Lizard. The present structure, completed in 1882, is the fourth Eddystone Lighthouse. The first, made of wood and erected in 1696, was carried away in a storm seven years later. The second, also of wood, was burned down in 1755. The third was a circular tower, built by Smeaton between 1757 and 1759. Its remains can be seen in the photograph. The light from Eddystone is visible 17½ miles.

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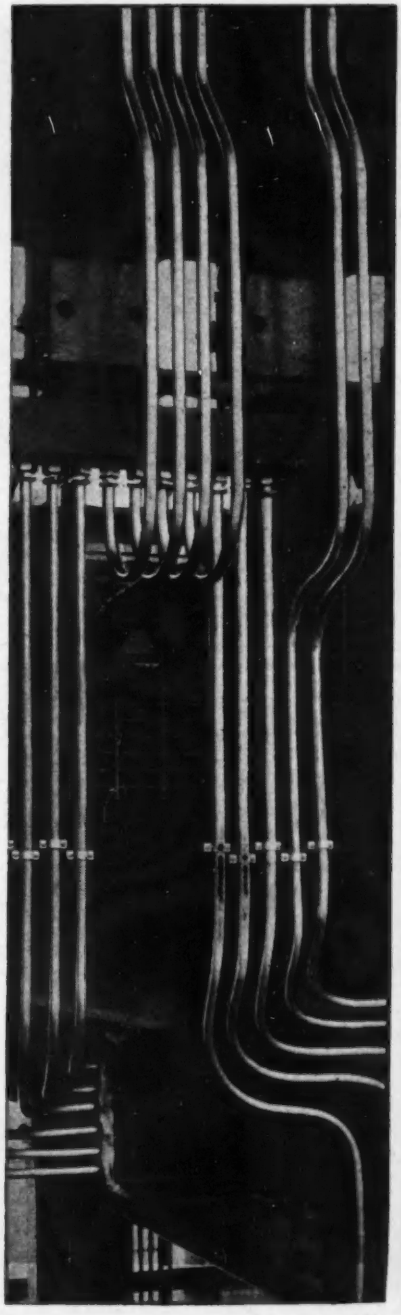

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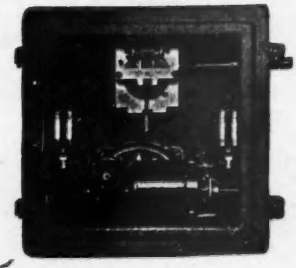

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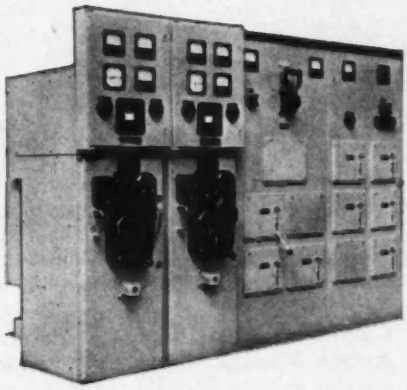

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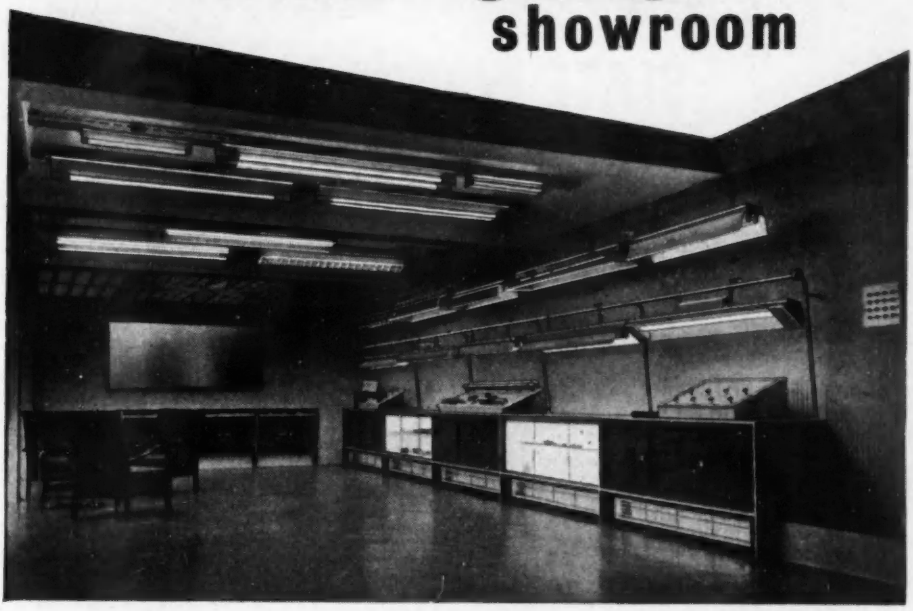

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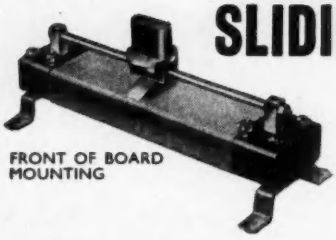

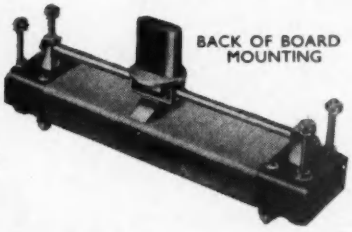

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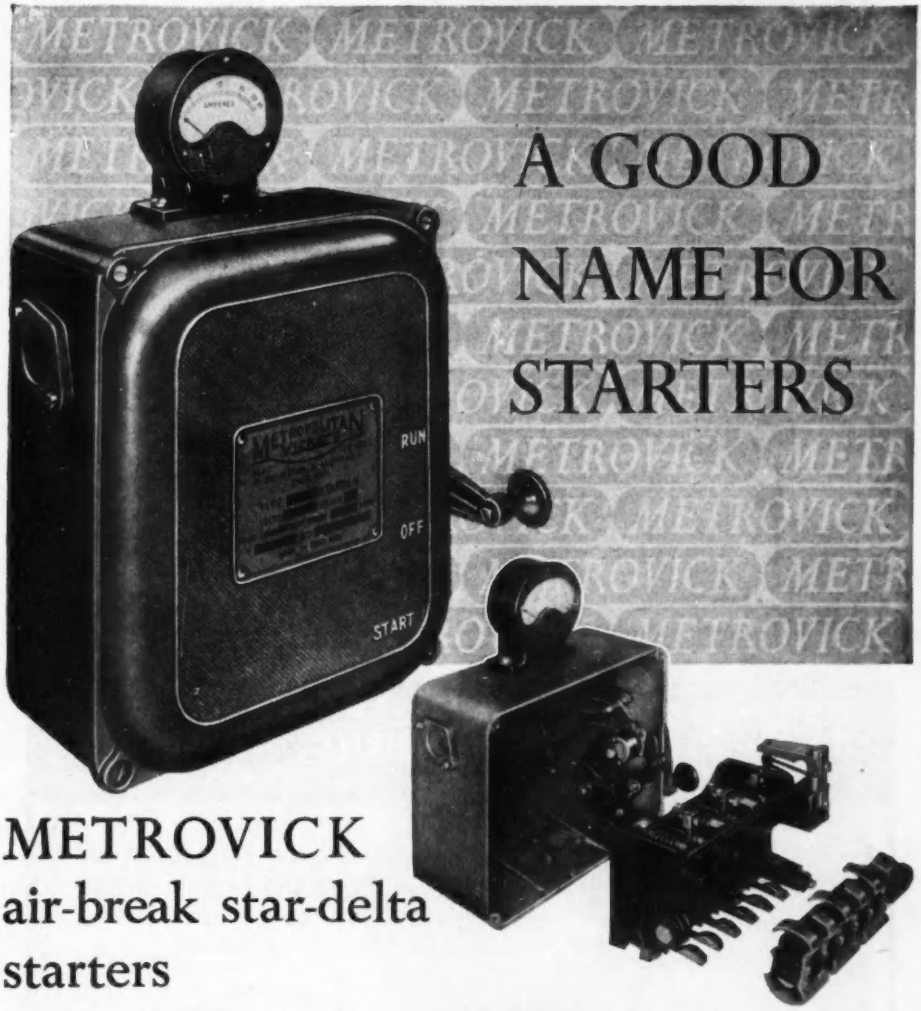

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METROVICK *Control Gear for all Motor Drives*

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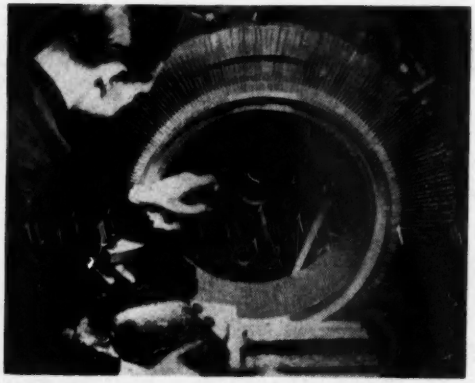

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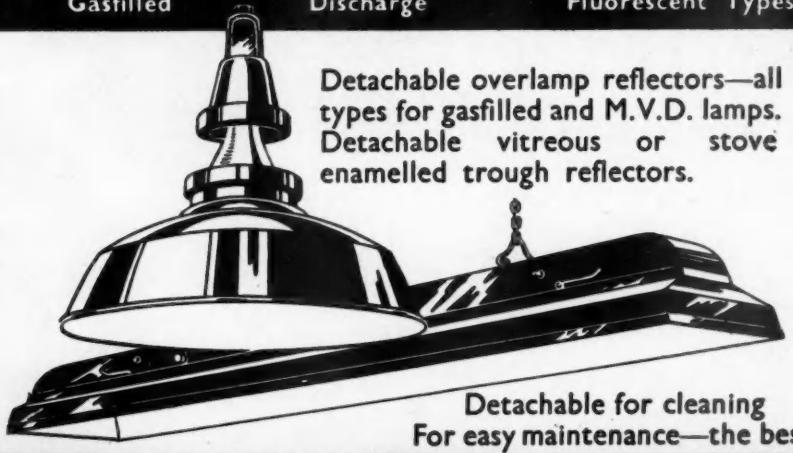

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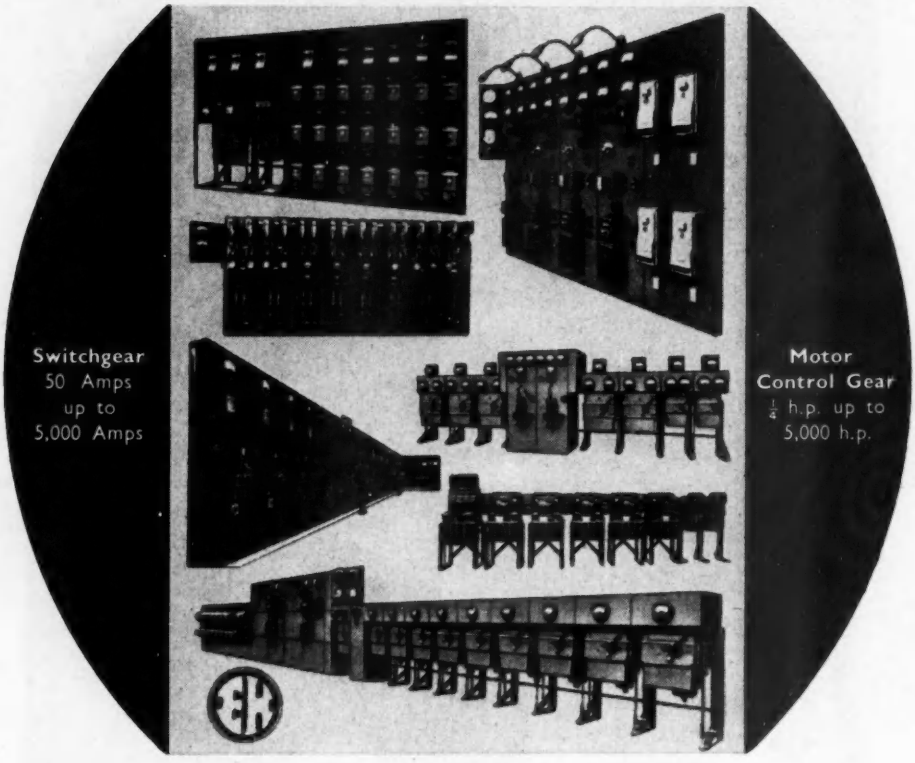

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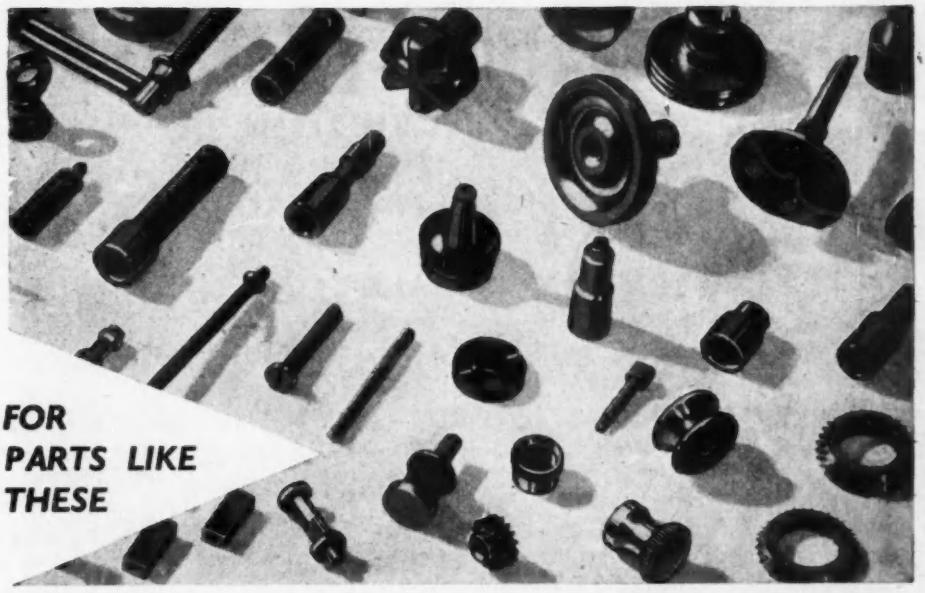

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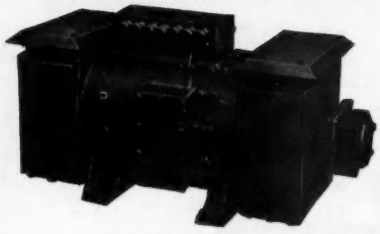

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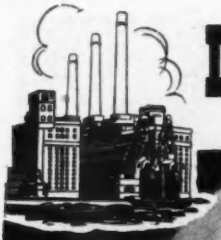

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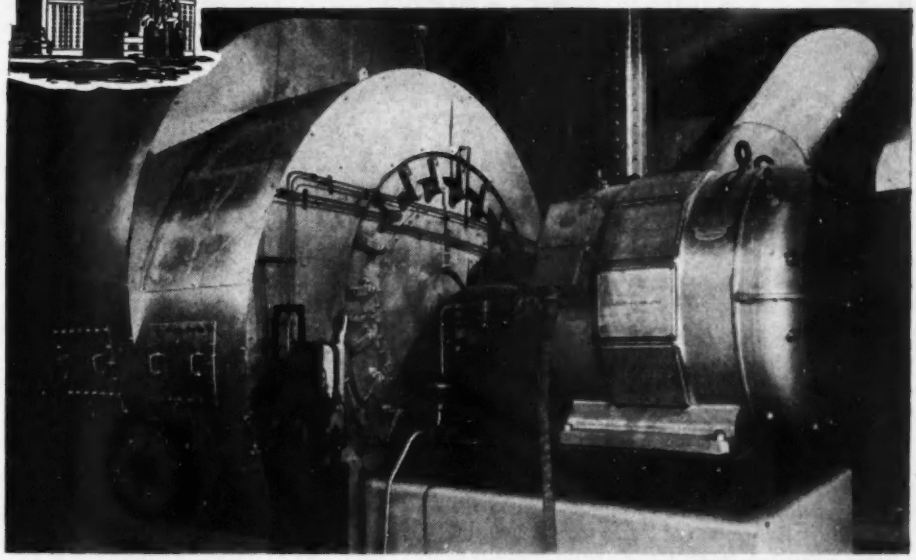

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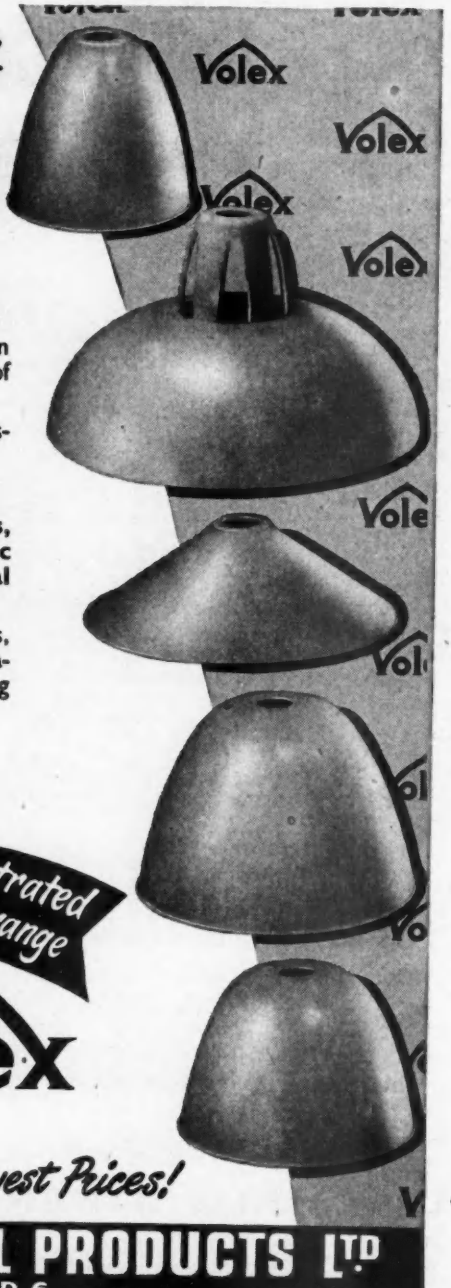

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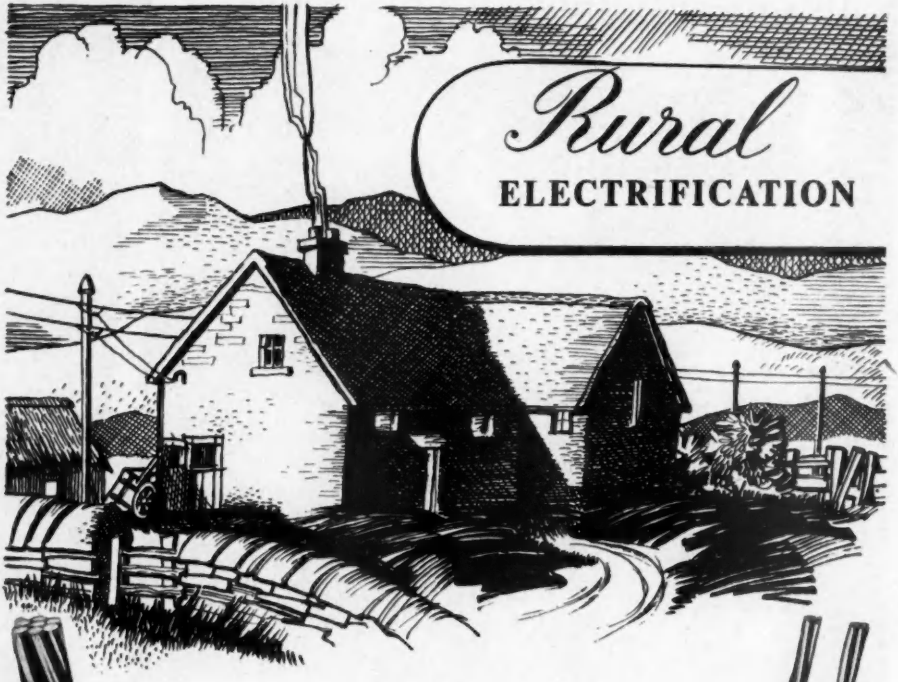

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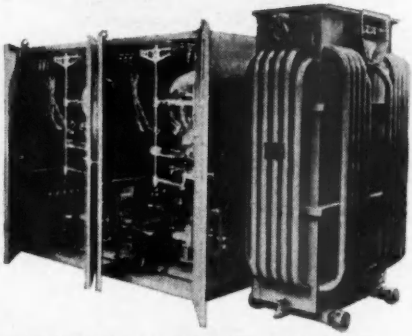

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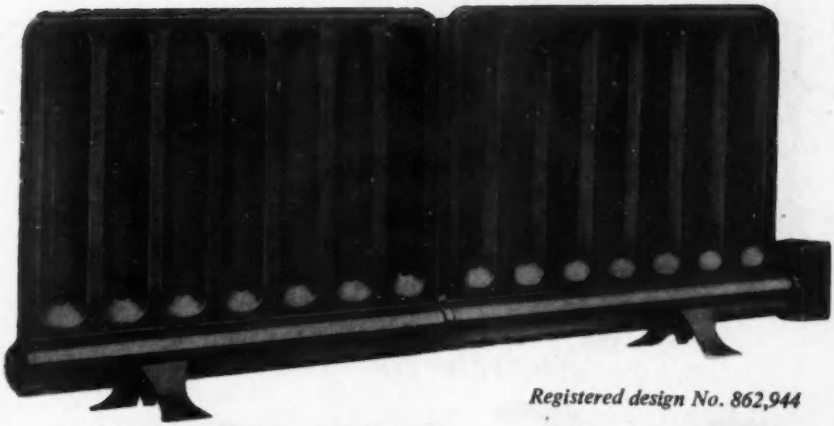

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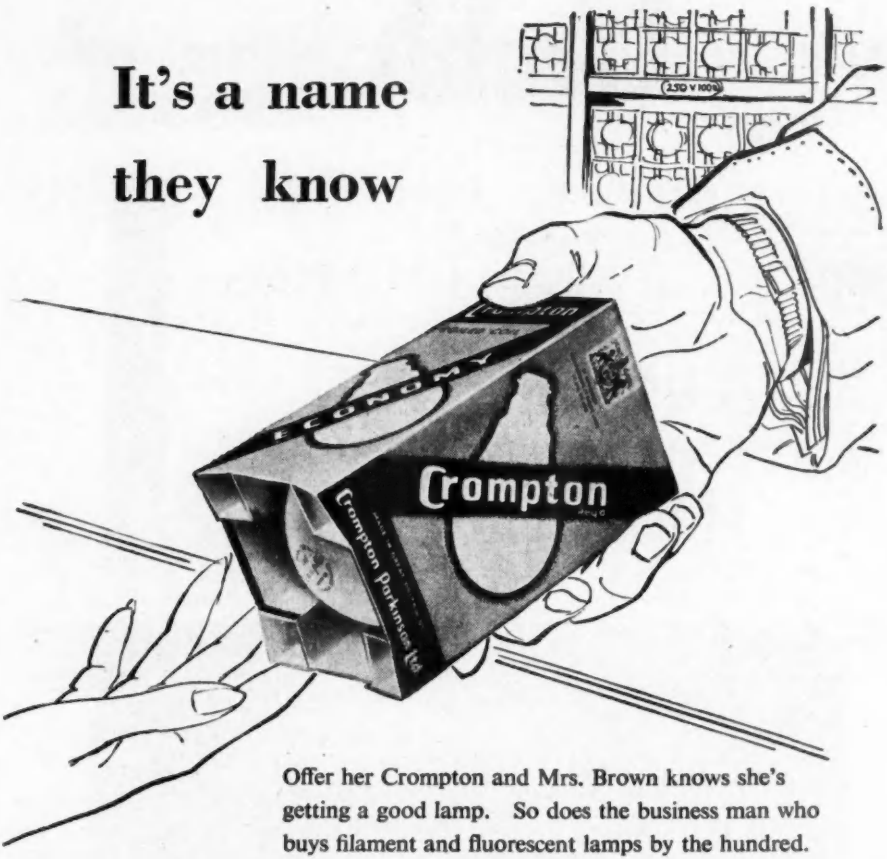

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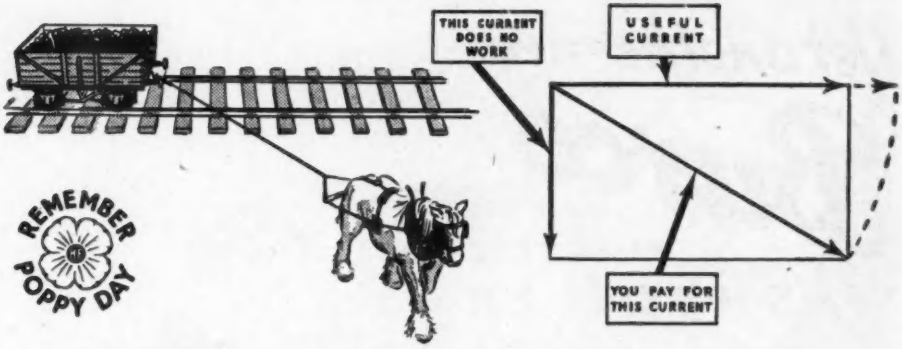

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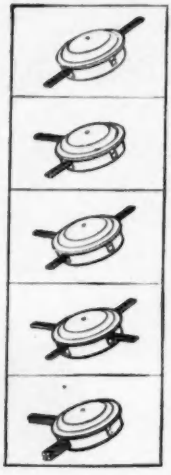

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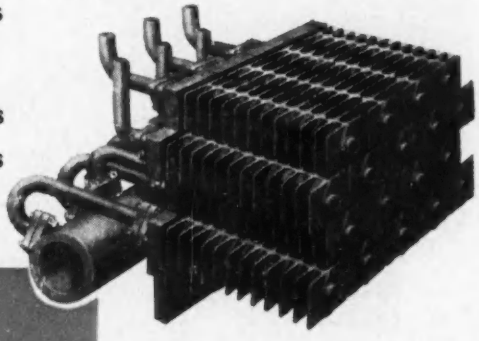

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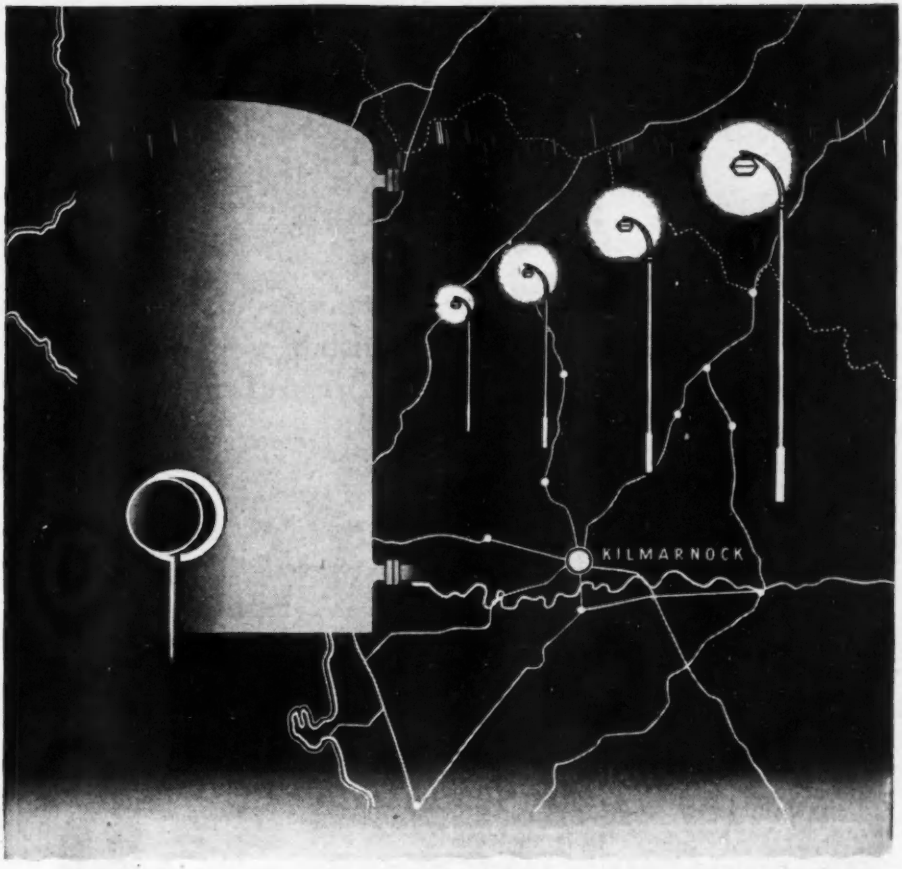

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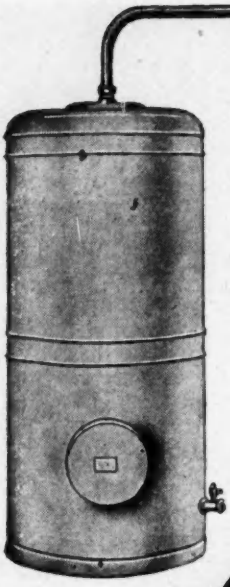

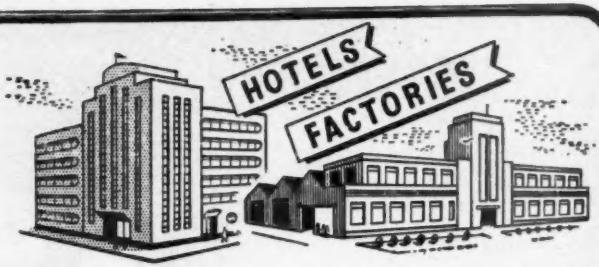

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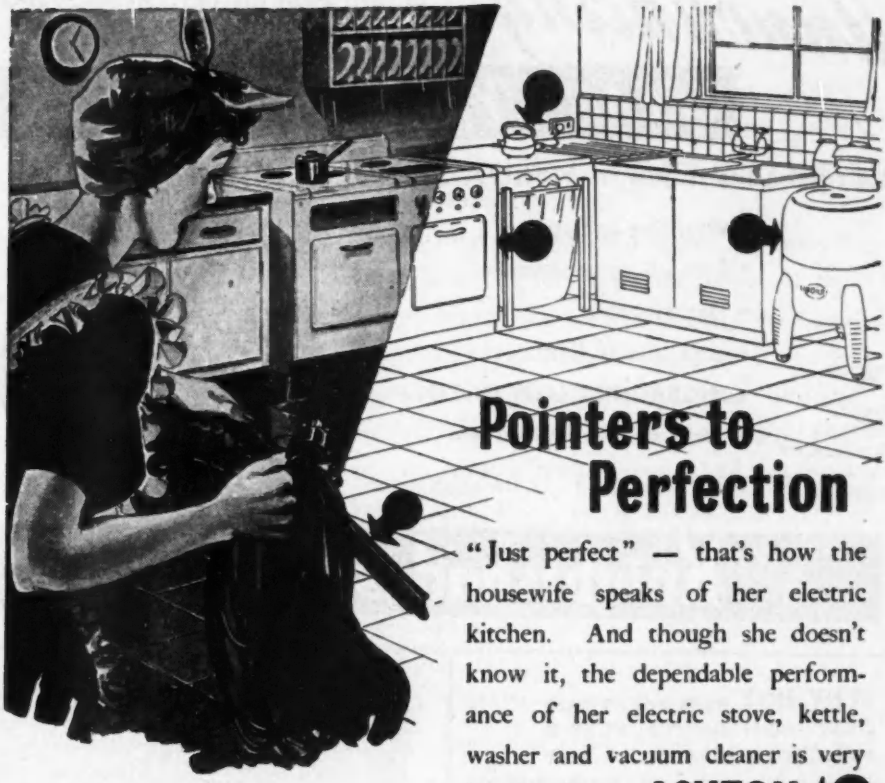

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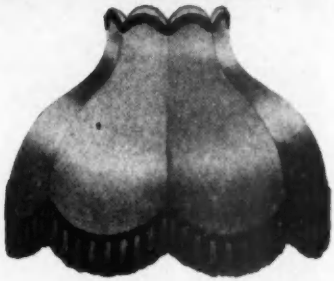

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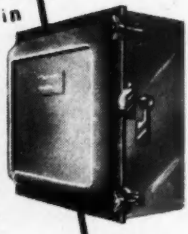

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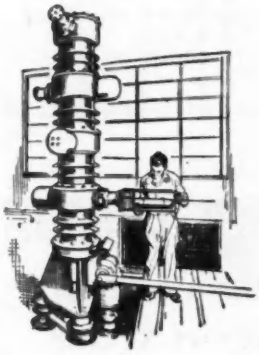

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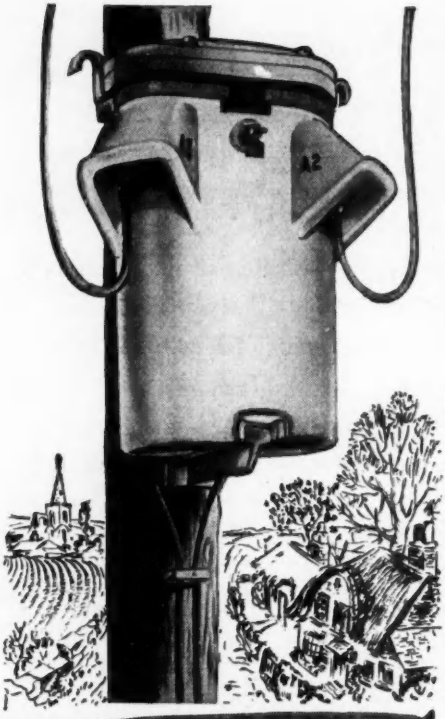

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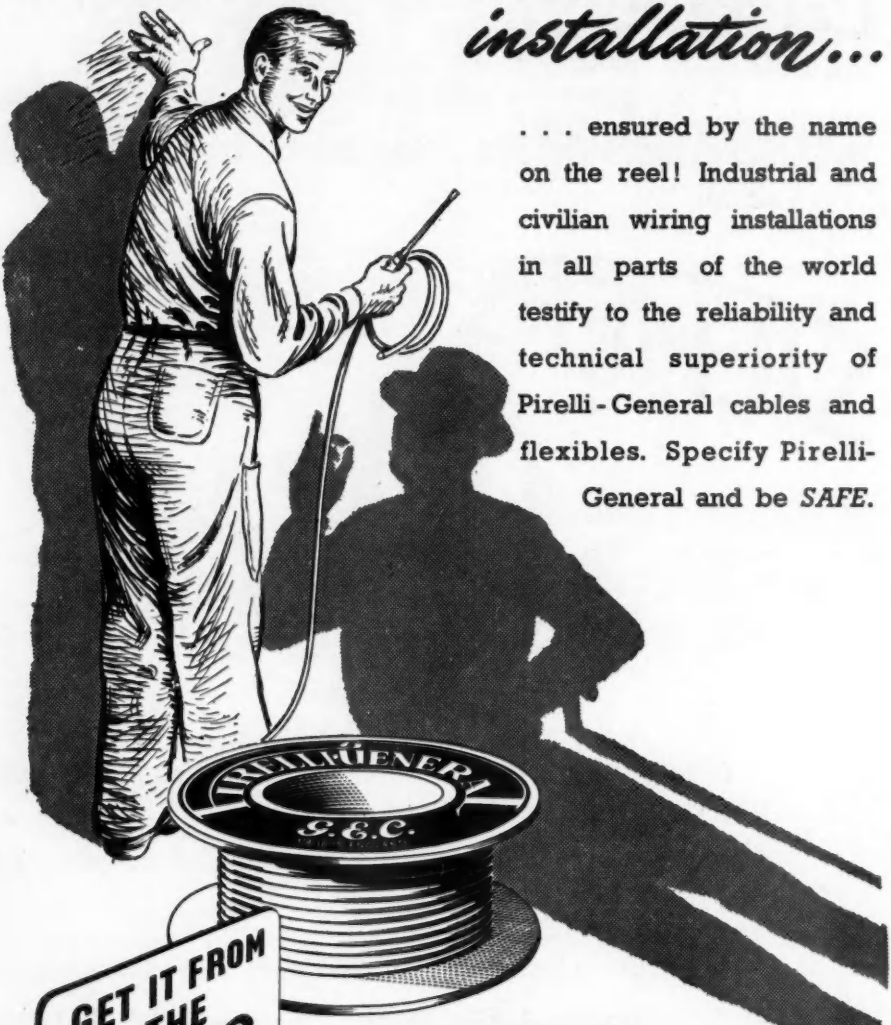

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ELECTRICAL TIMES

Vol. 122 No. 3181 THURSDAY, 23 OCTOBER, 1952

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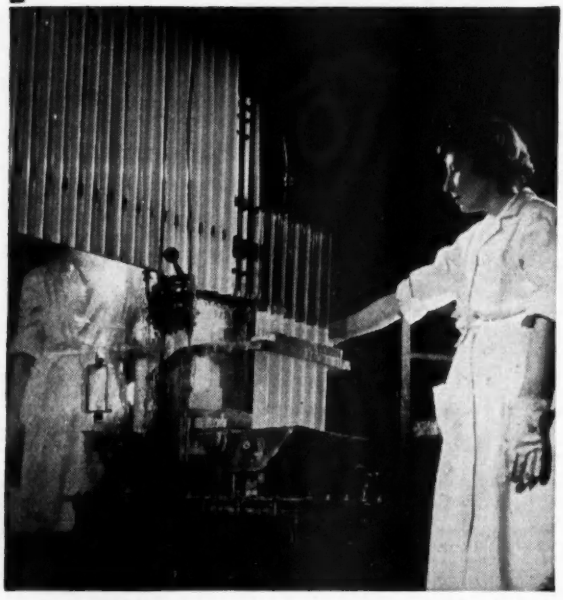

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Editorial

PUSHING BACK DELIVERY

IT is a common expression in trading circles today that business is "patchy." In some sections of industry, business continues to be steady but in others it is decidedly flat. What, however, has become a frequent feature of trading today is the co-existence of a full order book with insufficient work in hand to maintain the factory at full capacity. Such conditions we feel are a survival of the over-ordering of the last few years. Customers with a steady demand for goods, placed orders for months, perhaps years ahead. Now with the drying winds of recession in the air, manufacturers are asked to push back delivery schedules; goods ordered for delivery within three months will not be required until six months and so the delay proceeds. This effect is partly due to a falling off in sales, while in addition retailers and users are not always willing to carry such large stocks in the present atmosphere of uncertainty and weakening prices. Economists tell us that the working down of stocks is a contributory cause of slumps but it is hard to believe that in the present instance conditions are likely to deteriorate to that extent. A falling off in trade from the peak level of the last few years there may be, but a slump seems unlikely with the present low level of unemployment. However, in the present difficult conditions it should be the duty of customers to give to manufacturers realistic dates of delivery in the same way as they asked for them in the immediate post-war years. It is only with such knowledge that manufacturers can properly plan their production schedules, a task never easy, but doubly difficult today.

AID FOR EXPORTS

HAS the electrical manufacturing industry been receiving the help it deserves from the Government in its export effort? According to Mr. C. T. Melling, who delivered his presidential address to A.S.E.E. members on Tuesday, it has certainly not, so far as domestic appliances are concerned. That healthy home market, whose need is agreed by all who study the problems of selling overseas, is prevented by the unreasonable and unequal imposition of purchase tax on such products, and by restrictions on the advertising and salesmanship of those who deal in them. This outspoken claim for a more helpful approach to export sales gains weight from the proven willingness of Mr. Melling to disregard manufacturing interests when occasion warrants, as in the Eastern Board's prompt stopping of electric fire sales when peak difficulties seemed to count against their use. The manufacturers' claim for better treatment at home must benefit, also, from any examination of the recent record of the electrical industry in the export field, and from a consideration of their willingness and ability to sell even when they have to carry the burden of home difficulties. In our view—and, it seems, in Mr. Melling's—there are reasons still more fundamentally important why the extended use of electrical appliances in British homes should be encouraged. None the less, this argument from the external economic situation should not be neglected when the case against restrictions is pressed upon the Government.

SHORTENED CENSUS

MOST manufacturers will welcome the announcement in the House of Commons last week, that the Census of Production will be continued on a sampling basis for 1953. For the type of information extracted by the census, this technique is well suited, and the very full results of the 1951 census should serve as a check for those who doubt all statistical short-cuts. Indeed, even those large establishments which do not fit in conveniently with such a scheme

will, together with the chosen smaller firms, have an easier task than before, since it is claimed that fewer questions are to be asked than in any previous census. Just what those questions will be is not yet known, but one that did appear in the 1951 form will probably not need to be repeated—the enquiry on private generating plant. This will yield the first authoritative estimate of the total installed capacity in this field, and should provide ammunition for many new discussions, as well as a corrective to some widely ranging guesses.

TIME FOR RESEARCH

SUNDAY's setting back of the clock will introduce once more lighting-as-you-go-home throughout the country. This year will at least offer the cheering advantage of colourful displays in shop windows and on advertisement positions to relieve the gloom of winter weather. Though the ban on late afternoon lighting was removed because of increased fuel availability and plant capacity, the relaxation has appropriately taken effect in a month when the scientific world has been celebrating the centenary of Sir William Ramsay, discoverer of neon, argon and the other inert gases. His work laid a necessary foundation for many of the advances that have since taken place in the art of electric lighting. Even when an inert gas is not the essential source of illumination in a lamp, one of the series plays a part in its operation. Seeing the lights, those millions of homeward bound workers might —though they won't—spare a thought for the true relation of pure research to industrial development, about which so many vague and uncertain speeches are made.

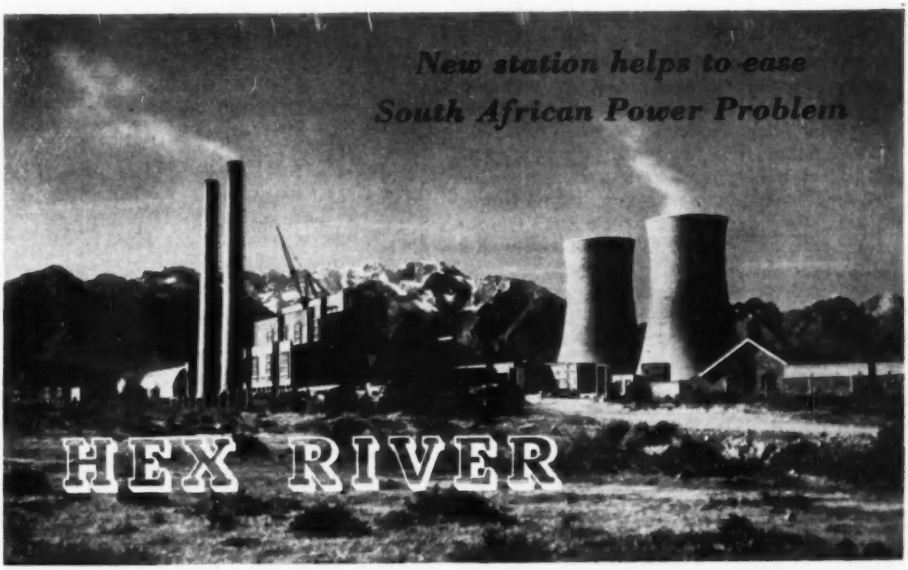
EDUCATING ENGINEERS

UNIVERSITY engineering teaching methods certainly came in for severe criticism by Sir David Pye in his presidential address last week to the Institution of Mechanical Engineers. And the fact of his holding the position of Provost of University College until last year added force to his remarks. An over indulgence in mathematics comes in for particular censure but the real task, which he asks technical colleges to solve, is how to teach the "art" of engineering; to encourage the practical and creative side of the student. The gap between the new graduate and the qualified engineer is a very real one and although Sir David is forthright in his disclosure of these defects in our educational system, they are not wholly new to educationalists. On means of bridging the gap between the practical and the academic, Sir David is not so precise; for the encouragement of a basic feeling towards a profession is not capable of exact definition and the simple fact remains that in the end we do turn out good quality engineers, whatever may be the faults with the educational system. All this suggests that the basic quality is there when the student enters the college and will develop satisfactorily even after training. What, therefore, seems to be the immediate task, is greater care in the selection of students and more thorough guidance on the direction their studies should take.

FLUE GAS WEALTH

ADVANCES in the science of electronics have given ash and soot from furnaces an importance as a practicable source of germanium and other rare metals used in the construction of transistors and other recently developed devices. Flue gases themselves, in an age of prospective and realised shortages of materials, may in some circumstances be persuaded to give up their sulphur content as valuable sulphuric acid. The latest advance in this application of boiler by-products has reached us from an American source. A factory manufacturing magnesite thermal insulation used carbon dioxide gas as part of its process, so when the time came to re-equip its process steam and electricity generating plant, it followed this modern trend, and looked to its boilers for raw material. Appropriate instrumentation and the arrangement of diversion doors now ensures that the CO_2 required is delivered where it is needed. It seems that the only development wanting for the appropriate conclusion to this story is some financially rewarding application for the moisture in the flue gases.

Meteor



PART of the intensive programme of electrification now being undertaken by the Electricity Commission of South Africa, Hex River power station is one of the latest to go on load. Located near Worcester in the Cape Province, the station has been constructed primarily to supply power for the electrification of the section of the main Cape Town-Johannesburg railway line between Cape Town and the Touws River at the top of Hex River Pass.

Initially the installation will comprise three 20 MW turbo-generators with four 200 k lb/hr boilers. The first unit went on load at the end of May this year. It is estimated that the cost of the initial section will be £3,600,000, but provision has been made for further extensions to take place as required.

Boiler Plant

The boiler plant has been supplied and erected by Messrs. Babcock and Wilcox of Africa, in association with their parent company in the United Kingdom. The units installed are of the high head cross-tube marine type, and are designed to burn Transvaal coal on Babcock-Detroit RotaGrate spreader stokers. This type of stoker has a chain grate which moves from the rear to the front of the furnace, and the fuel is spread by rotary throwing equipment located at the front. The principle of this is that the heavier coals are thrown to the back of the grate, the lighter fractions falling in the centre and the lightest at the front. Thus there is a longer time for the heavier particles to be burnt.

Bailey walls are used in the furnace proper, and the hot gases then pass between the boiler tubes and through a two-stage horizontal multi-loop type self-draining superheater to a three-bank flash-welded plain tube economiser. Following the economiser is a coarse grit arrester, and the grit trapped at this stage is refired in the main furnace by taking it back in a portion of the secondary air. From the coarse grit arrester, the gases pass on via a fine grit arrester to regenerative type air preheaters, and then to the induced draught fans and the brick chimney stacks which are some 250 ft high.

The economiser is supplied with feed water at 340° F and superheater steam outlet conditions are 625 lb/sq in. at 825° F. Although the maximum continuous rating of the boilers is 200 k lb/hr, the economical rating is 160 k lb/hr. Continuous adjustment of the superheater temperature is not provided, but an off-load adjustment can be made by means of a removable tile system which permits some of the furnace gases to by-pass the superheater. Combustion air is taken from the top of the boilers and supplied to the preheaters by forced draught fans located in the basement.

No division wall exists between the boiler and turbine house above operating floor level, the four boilers being arranged in a single line facing the turbine house. The general transverse arrangement of plant can be seen from the cross sectional view in Fig 2

Turbo-Generators

Generating plant consists of direct coupled 3,000 r.p.m. turbo-alternators built by the British Thomson-Houston Co. The turbines are two-cylinder tandem machines of the impulse reaction type and are arranged for four-stage feed heating, one l.p stage being before the feed water pump and the remaining three between the feed pump and the boiler. Output of the generators is 22·2 MVA at 11 kV with a normal p.f of 0·9. Economical rating is, however, 16 MW. Direct driven exciters are employed. Two steam condensers, operating in parallel, are supplied for each turbine, so that either half may be cleaned with the machine running at reduced load. In the event of reduced vacuum, a turbine load suppression gear comes into operation to reduce the load on the machines. Circulating water is cooled in hyperbolic cooling towers of Mouchel design, make up water being obtained from the adjoining Hex River.

Station pipework was supplied by Messrs. Stewarts and Lloyds, and follows fairly conventional lines, three of the boilers being directly connected to the turbines with a "tee" into an interconnector. The fourth boiler, connected directly to the interconnector, normally acts as standby to any of the others. The condensate system is arranged for normal operation as closed feed; i.e. any water drawn from the surge tanks has to pass through the condensers for deaeration before being passed to the boilers.

Electrical Equipment

Each generator has its own breaker which is connected to a reactor to indoor 350 MVA, 11 kV switchgear and then to the outdoor 1,000 MVA 66 kV switch yard through a step-up transformer. From the 11 kV system, feeders are taken off to give a supply to Worcester Town and local farmers. The main output, however, is through the 66 kV feeder system which supplies the railway sub-stations and also feeds various municipalities and extensive rural networks. The 66 kV system also serves to interconnect Hex River with other stations in Cape Town.

Automatic tie-line load control, carrier current telemetering, relaying and communication are used on the 66 kV tie lines. In some cases, distance relays are used in conjunction with carrier relays, to provide main protection throughout the 66 kV network.

A separate building, connected by bridges with the turbine house contains the 11 kV and main station switchgear. This building also houses the switch operating room and the administrative offices. Both 11 kV and 66 kV switchgear incorporates oil circuit-breakers, whereas the 3·3 kV and 380 volt station and auxiliary switchgear is of the air-break type.

Control panels in the switch operating room have been made in South Africa and are of the corridor type, while for protection purposes miniature circuit-breakers have been used in the control and lighting circuits.

Coal and Ash

Coal is delivered to the site by the South African Railways and is normally off loaded in a wagon tippler. The coal handling plant, which is in duplicate, comprises belt conveyors for the horizontal runs, and Redler elevators for the vertical lifts. Provision has also been

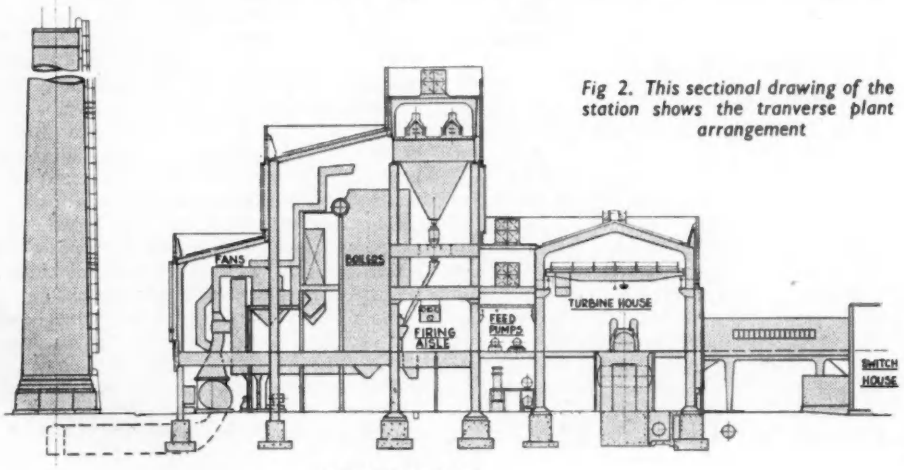


Fig 2. This sectional drawing of the station shows the tranverse plant arrangement

HEX RIVER POWER STATION

made for coal crushing should this be found necessary.

The ash is dumped in various depressions adjacent to the site, and to provide for flexibility is removed by motor vehicles. These lorries can be driven directly under the ash hoppers for loading, no conveying plant or outdoor storage bunkers being supplied. The fine grits which are collected in the cyclone type grit arrestors are transferred to a central storage tank by Redler conveyors. This tank is emptied periodically through a mixer conveyor which damps the dust and discharges it into the same lorries as are used for ash removal.

Civil Engineering Work

As can be seen from the heading block which was kindly lent to us by Babcock & Wilcox, the main building has an impressive appearance. It is a steel framed structure clad in brick and box columns were used wherever possible to give a clean appearance and to avoid innumerable shelves liable to collect dust. For the turbine house a portable arch construction was used again avoiding flat surfaces liable to collect dust, as would have occurred had the normal type of roof truss been used. The use of box sections had an added advantage in that the steel sections involved lay within the rolling capacity of South African steel mills. The boiler house and fan annexe are of lean-to construction abutting the main bunker structure. Again the cross-sectional drawing shown in Fig. 2 will clarify the steel frame arrangement.

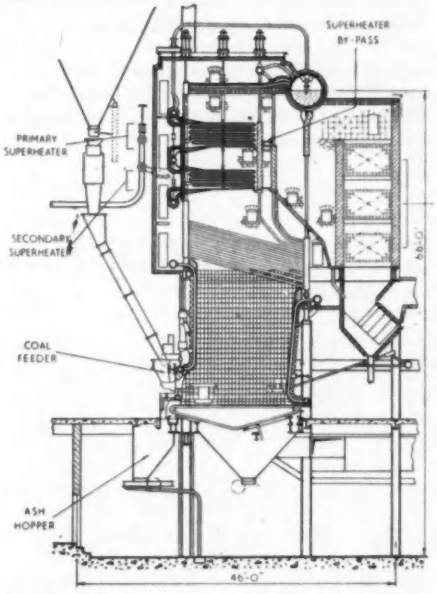
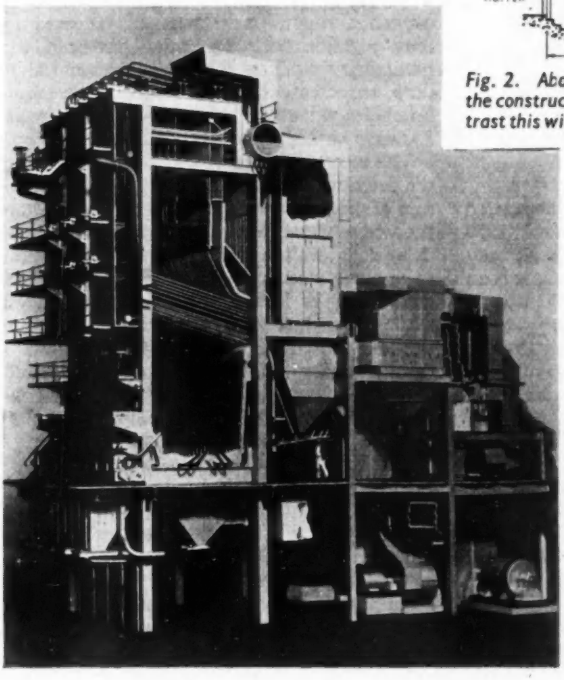


Fig. 2. Above is a cross-sectional drawing to show the construction of the boiler. It is interesting to contrast this with the model shown in the photograph on the left, Fig. 3



A prominent feature of the station is the size of the windows used, a feature which results in a well lighted interior, particularly in the boiler house. Good natural light is also available in all other localities.

Auxiliary Buildings

The building housing the switch-house and office block is of concrete clad in brick. Normal construction has been adopted for the office section of this building, but the section housing the switchgear is of heavier design to meet the large reactive forces occasioned by the operation of the main circuit-breakers which are located on

the upper floor. The building is air conditioned and connected to the power station by overhead bridges at turbine operating floor level.

A concrete coal staith of 10,000 tons capacity has been provided to meet fluctuations in the supply of coal occasioned by the long rail journey from the coal fields. The staith is of the self-emptying type and has been completely roofed in to reduce coal dust nuisance in the vicinity. All the coal conveyors are located in underground concrete tunnels and coal elevation is confined to vertical elevators incorporated within the buildings, which again gives a clean appearance to the layout.

A workshops and stores steel framed building divided into three bays, each provided with an overhead electric crane, has been provided to meet the requirements of the power station and the distribution system in the area.

The main condenser cooling water is cooled in concrete hyperbolic cooling towers of which two have been built to meet the requirements of the present station. The circulating water pumps are housed in a separate pump house, the pump level being located some distance below the level of the cooling tower ponds. Thus the circulating water pumps on all occasions have a drowned suction.

UNDERGROUND GASIFICATION

Electricity Generated at New Site

SINCE March of this year electricity has been generated on a small scale from gas produced at this country's second underground gasification plant at Bayton (Worcs.). Underground gasification has been adopted as the means to utilise coal which is economically un-minable and energy thus liberated is used for the generation of electricity. At Bayton it is hoped, when operation graduates from the preliminary stage, large scale schemes will become an economic proposition, although it is generally acknowledged that some years of further effort will be necessary before this method can be commercially exploited.

Early Progress

The first scheme of this nature was started at Newman Spinney, Chesterfield, in mid-1950 and has indicated that the process is technically practicable, although operations there have been on approximately twice the scale of those at Bayton. Initially the 1950 trials were piloted by the Ministry of Fuel and Power with later active co-operation and financial assistance from the National Coal Board. Work at both sites is now assisted by a Scientific Advisory Panel consisting of the N.C.B., B.E.A., fuel research and other organisations.

At Newman Spinney, however, the technique employed avoids horizontal boring in the seam, a major task beset with many difficulties. Vertical boreholes, 33 ft apart, were sunk and into one of these was pumped compressed air which forced its way along the seam to the other boring. Having established this path, the coal at the bottom of the high-pressure hole was ignited and the compressed air maintained until the coal had been burnt through to the second hole, when gasification was then continued at low pressure.

New Method Uses Oxygen

A modified version of this technique has been employed at Bayton, in which a mixture of oxygen and air, under pressure, is used to initiate gasification. The result has been, for preliminary work in the Brosely seam 100 ft deep, an increase to 50 ft in the spacing between boreholes. Finally, when the 230-ft seam (Bank Farm) is ignited, the span will be 150 ft.

This increase in span plays its part in delaying the deterioration, in both quality and temperature of the gas, which occurs as the gasification proceeds. Other means have been sought to delay deterioration and to transfer the reaction to another section of the coal seam. To this end, boreholes for the Brosely seam have been made in a hexagonal pattern to provide flexibility in the direction of the air streams through the burning seam. Additional research is also being conducted into methods of controlling air flow, drilling, borehole linings and suitable prime movers.

Last week, Mr. Geoffrey Lloyd, Minister of Fuel and Power, in a visit to the site, stated that progress in underground gasification was sufficiently promising to encourage investigation into the practicability of building power stations above coal seams suitable for underground gasification. Should this be possible, he added, millions of tons of coal, at present un-minable, would become available for use.

TAKE the TAX OFF WATER HEATERS

TREASURY POSITION IS UNTENABLE IN FACE OF RIDLEY REPORT

"The choice between fuels should be left as far as possible to the individual customer."

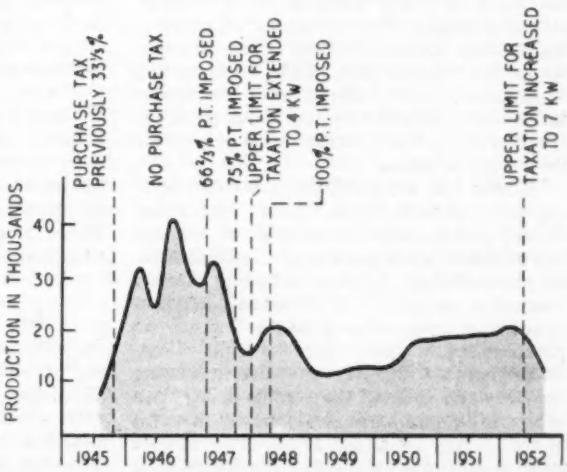
THAT is one of the conclusions of the Ridley Committee. But how, we ask, can there ever be freedom of choice when the scales are weighted in favour of solid fuel by purchase tax of penal proportions on all competing equipment? How can the consumer ever reach a truly free decision based on personal economics when the cost of the appliance is subject to the varying whim of Whitehall? Can there ever have been justification for imposing on such utilitarian appliances as water heaters, a rate of tax reserved only for a few of the luxuries of life?

How and why has this state of affairs been reached? It started during the war with enthusiasm over the convector type solid-fuel fire which led the powers-that-be to authorise for its manufacture a special allocation of iron from our scanty reserves. From that time on, there has been no looking back. The ministries have made a fetish of solid fuel, dazzled by test efficiencies, and largely ignoring all the many other factors which go to make up the heat supply to a house.

There is no more glaring case of ill-conceived policy than the purchase tax provisions in respect of water heating. The tax has been removed, imposed, increased, varied, lowered and raised, until commercial manufacture might well be regarded as a new form of gambling game. The effect of this vacillation of policy is revealed in the accompanying graph which shows production figures for immersion heaters over the past seven years. Superimposed on it are the variations in purchase tax and the time they took place. It will be seen that within a few months of every increase in tax there has been a decline in production, until today output is running little more than one quarter the peak value when there was no purchase tax imposed, although, to be fair, the present recession is in part to blame for the latest fall.

What Reasons?

Before one reaches the conclusion that it has been the deliberate policy of the Treasury, artificially to restrict sales of electrical (and also gas) appliances, it is fair to ask whether the tax was imposed for reasons other than to favour solid fuel. Certainly if revenue were the sole reason for the high tax then a grave mistake has been made, for there are indications that the rate imposed has gone beyond the point of diminishing returns and there have been cases where the revenue has tended to fall as the tax has been increased. Secondly, if the purpose of tax was to reduce inflation then unquestionably, it has had some influence, but this is a common effect of all taxation, and one that is less effective with water heaters, in view of what has



Here is shown the production of electric immersion water heaters during the last seven years, and each change in the purchase tax imposed on these heaters. The curve, drawn from figures based on those given in the monthly review of statistics published by the Board of Trade, indicates the fall in production after each new imposition of purchase tax

been said on revenue yield. But whichever the reason, be it revenue or anti-inflation, all such arguments are invalid since no corresponding tax was placed on solid fuel fires. Not even the inefficient old-type fire, condemned alike by Whitehall and solid-fuel enthusiasts, was so much as touched by the chilling influence of purchase tax.

It is clear, therefore, that the tax policy was a spiteful one, designed solely to restrict sales of electrical immersion and water heaters. The next question to answer is whether such a policy was in the best interests of the nation as a whole, having regard to the economic position in respect of fuel. Here, too, separate objections may arise, one resulting from the need for restriction on peak-load usage, and the other concerning economy in coal consumption. These two objections must be considered separately.

Technical Factors

As pointed out in Mr. Sanders' paper at the B.E.P.C., this year, authoritative tests have shown that water heaters in use throughout the year have a diversity factor of four to five at the time of the morning peak, which admittedly is not as high as desirable. He suggested methods by which this diversity could be increased, and if the removal of restrictions on lighting should result in a swing back of the time of peak to evening, this morning water-heating load would cease to be a material factor. However, there is one overriding factor which alters the whole aspect of the problem. By far the greatest part of the water-heating load occurs only in summer and consequently cannot affect in any way the winter peak. It is this which makes it such a desirable load for the supply industry.

Turning now to the efficiency of water heating, it is commonly conceded, even in solid-fuel circles, that for water heating alone, without any attendant space heating, gas and electricity are more efficient in the overall usage of coal, than solid-fuel appliances. If this be insufficient to convince those who advise the Treasury on purchase tax, let them study the Ridley Committee report. There it is stated that in summer the hot water needs of the average family "can probably be met more economically in terms of coal by the use of gas or electricity than of solid fuel." And if further confirmation is needed, let them go back to the Simon report of 1946 where a similar view was put forward.

What then does this amount to in actuality? It means that for every immersion or storage water heater that has *not* been installed because of purchase tax, just so much is the Treasury to blame for the consequent greater coal consumption. Far from discouraging the uneconomical use of fuel, it is actively encouraging it; instead of according with national interest it is running contrawise. Indeed, such unfounded favouritism has been shown to the solid-fuel interests that if the integrity of the Civil Service were not so well substantiated, there would be room for the gravest suspicions.

Joint Representation Needed

What action then is to be taken to correct this state of affairs so inimical to a proper fuel policy and so damaging to the electrical industry. Official representations have been made before, only to be received with politeness and little else. Only by joint action on the widest basis of representation can sufficient pressure be brought to bear to effect a change in the official line of thought.

It is in the supply industry's interests, no less than that of the water-heater manufacturers, to see re-established a proper basis of freedom of choice for the consumer. Consequently, there would seem to be a clear case for a joint approach to the Treasury on this subject of purchase tax on water heaters and immersion heaters. We would suggest an even wider basis of representation if it could be secured. The gas industry has similar grounds for complaint to those of the electrical industry and although they are our traditional competitors this should be no obstacle to inviting them to join an official deputation or to make coincident individual representations.

Whatever may be the course decided by those concerned with freeing water heating from its artificial shackles, they will have to face a position entrenched with preconceived ideas and the need to maintain excise revenue. Timing is of the essence of the task and with the Ridley Report fresh upon the table the auguries for the present look more favourable.

E.I.A. LONDON DISPLAY

NOW an annual event in London's exhibition calendar, the London Regional Display of the Engineering Industries Association, which took place last week, at the New Horticultural Hall, S.W.1, gives the buyer an excellent composite shop-window on the various activities of the many engineering firms in London. It is excellent in that the smaller manufacturer is afforded an opportunity to display economically his wares to an audience composed of engineering buyers.

The Art of Engineering

Sir David Pye's Address to the I.Mech.E.

SOME extremely critical and pertinent remarks on technological education were made by Sir David Pye when he delivered his Presidential Address to the Institution of Mechanical Engineers last Friday. Sir David's career has particularly suited him for an objective appreciation of engineering education both from a practical and theoretical viewpoint and his speech showed a remarkable general outlook on the subject.

He began by giving some reminiscences of his early days when he took the position of assistant to the first Professor of Engineering at the newly formed school of engineering at Oxford. At that time Professor Frewin Jenkin held the Chair, and antipathy on the part of other faculties made life somewhat difficult. The school was small—only some 30 honours students, but they were of high quality and a pleasure to teach. Research work occupied much of the time, and the first tasks undertaken were the derivation of fundamental data on the two most common refrigerants, ammonia and carbon dioxide.

War Experience

In 1914 Sir David decided to leave Oxford, but the outbreak of war saw him swept up with many other young Cambridge men into the R.F.C. experimental branch under Professor Bertram Hopkinson. After the war, in October, 1919, he moved to Cambridge University and began some busy years of co-operation with Mr. (now Sir Henry) Tizard and Messrs. Ricardo and Co. on the detonation of fuels in internal combustion engines. The object of the experiments was to establish the physical and chemical causes of detonation, and the final results of the work were published in two papers in the *Philosophical Magazine*.

When, in 1924, the Air Ministry established a Directorate of Research, Sir Henry left Cambridge to become the Deputy Director under Mr. Wimperis. In this position it was his job to act as a "wet nurse" of new ideas. Although not directly manufacturing, he had many friends in the engine development side—Roy Feddon at Bristol, Hives, Rowledge and Elliott at Derby with Sir Henry Royce, and latest but not least, Whittle and his jet engine.

When the last war ended, Sir Henry was offered the post of Provost at University College, London, and consequently resigned his position as Director of Scientific Research. Thus the wheel had turned full circle.

Engineering Training

The requirement of producing the engineers the country needed was vital and unfilled at the present moment. Looking back on his past career, Sir David said that he had been left with a profound sense of the yawning gap between the product of a university course and the qualified engineer, and—more particularly—of the importance in any organisation of the man of whom one felt he was by nature an instinctive engineer, though it might be with little or no scientific training.

No one imagined a student and an engineer to be the same thing, but it was only a small part of the way that all the theoretical training in which he was taught to manipulate formulæ on paper and record experiments in a book could take him. By the time he had "grown up" his book-learning would be hardly more than a vaguely-felt background to his experience. "For the art of engineering includes a very great deal that lies outside formulated theory."

An engineering education, said Sir David, meant the young generation coming forward eager to take responsibility and competent to do so *at all levels*. "At all levels" should be emphasised, because the people most vocal on engineering education tended to come from the universities and were apt to concentrate upon training at higher levels. The technical and technological manpower of the nation should be thought of as a whole: beginning with the skilled craftsmen and including draughtsmen, designers, research and development staff (junior and senior), and those who became managers and directors.

Designers

Sir David then took as an example, designers. The design section was the creative department of any works, and designers required that creative spark, which might be present in junior draughtsmen or even recruits direct from school. The university, although a place of learning and research, often presented itself to the student as a place where he had to acquire a degree in the shortest possible time. That did not make the atmosphere conducive

to the blossoming of a flair for ingenious design; nor were university examinations the circumstances in which this flair could be readily detected. Exams did not lend themselves to an assessment of a man's quality as a designer, and there appeared to be a danger that where there was no clear method of differentiating between the good and the poor student, the teacher and examiner might lose interest in design as the subject of an award for a degree.

This was quite apart from the fact that the teachers and examiners were for the most part of an analytical turn of mind, skilled in those methods of research whereby mighty results had been achieved in the past but only incidentally interested in new opportunities for design and construction.

Compromise in design

In a design office, things were not right or wrong: trial and error led gradually toward the best compromise in the special circumstances. The student should be made familiar with this; but in working out examples he employed well-taught mathematical techniques to find the solution of problems analogous to those in engineering, but different in form from those encountered in practice.

From its intake, we should expect the university to feed back into industry first-class minds with a well-balanced and technical background. But was the right way being chosen of providing the needed background while retaining sufficient flexibility to allow the spark of originality, where it existed, to grow?

Questions should first be asked about the methods whereby selection was made of young men who were to be allowed to embark on honours degree courses. In Sir David's opinion, this was being left too much in the hands of the mathematicians. Mathematics was admittedly important as a basis for engineering, but to rely on competence in mathematics for the selection of young men for honours courses was to risk the exclusion of quite a number who might have developed into the finest engineers. There were those who did not take kindly to the mathematical approach, and they should not be thrown out at the first hurdle. An understanding of the processes of mathematics up to, say, a solution of differential equations of the first degree was desirable as forming part of the normal shorthand used in engineering education. At a higher level, mathematics could be a powerful tool in the hands of those competent to use it. But the two categories should be kept separate.

Existing Scheme

Having selected those to be given the elements of a basic training in engineering we proceeded, in most engineering courses, to put them into a mental "strait-jacket" in which for a year they studied mathematics, physics, chemistry and machine drawing, with scarcely a hint of real engineering to encourage them. In the second year they were taught to apply scientific techniques to the solving of simple engineering problems and at the same time to enlarge the scope of their analytical work. The third year was devoted almost entirely to the solution of problems analogous to those which arose in engineering practice; and the solution of nearly all those problems involved mathematical techniques. There was no place in many engineering departments today for the man who had not acquired mathematical technique. All the pressure of an over-filled programme was directed to the somewhat sterile pursuit of solving artificial problems in engineering invented for examination purposes. This system lacked the flexibility to allow for the exceptional man, and did not help to develop the potential designer, works manager or the administrator.

Sir David deplored the almost pathetic faith shown in the advertisements from all Government departments (and some research associations who should know better) in the first- or second-class honours degree. He suggested that there were jewels to be found, by those who took the trouble to look, among the supposed refuse of third-classes and passes.

In conclusion, Sir David pointed out that the supreme phenomenon of the creative engineer was found when a designer of genius appeared, almost untaught. The classic example of this was probably Sir Henry Royce, who reached his mature skill as a designer almost without formal training. James Clayton, in the field of textile machinery, was another. Such men were rare and were likely to become rarer still in the modern world of machinery, for only men of genius could now survive the handicap of the absence of early training.

Along with the designers of genius we should also cherish those men who could be met in works from time to time who would never have passed the first of the examinations considered essential among the qualifications of an engineer, who might give the wrong reasons but would find the right answers. "They, within their range, are like the great ones—guided by an instinct that seems to achieve a distillation of relevant experience and can be counted upon to solve a practical problem in the most direct way."

Our readers' views . . .

Aluminium Conduit and Fittings

I HAVE read Mr. J. C. Bailey's contribution in connection with continuity of the above with interest, but would he consider a resistance of 0·15 ohm for a 12-yard run with eight joints good?

It should be pointed out that the requirement of B.S. 31/1933 for the resistance of *lug-grip* conduit and fittings, consisting of eleven pieces coupled by fittings must not exceed 0·05 ohm, whilst one of the recommendations of the ERA Report V/T109 is that any run of less than 100 ft of screwed conduit systems should not exceed 0·1 ohm.

It would be interesting to know the method and value of current used for testing the 12-yard run, as this has considerable bearing upon the result recorded.

T. C. Gilbert

FOLKESTONE M.I.E.E.

◆ ◆ ◆

Test Lamps

I DEPLORE the fact that you have seen fit to publish details of a lamp tester under the heading "Problems and Practice in Engineering" in your issue of the ELECTRICAL TIMES dated October 16, 1952.

The use of such lamps has been condemned for many years, due to the fact that in many modern installations, particularly in factories and heavy engineering plants, the prospective fault currents are extremely heavy should any of the wiring or switching arrangement of the tester prove faulty.

This tester gives no protection whatever against these possible conditions, and it has repeatedly been recommended by various organisations concerned with safety, that test lamps used for testing even low voltages up to 400 V as mentioned in the article, should be protected by h.r.c. fuses in the prods and be fitted with current limiting resistances where necessary.

There are a number of suitable and inexpensive types of test lamps at present on the market that have the protective features mentioned, and which, incidentally, can be hung up while in use as your correspondent "W. A." describes in his note.

In conclusion, I would point out that very serious accidents have occurred in recent years due to the use of apparatus of the type illustrated in your journal, and I consider it essential that warnings against this type of equipment should be published, so that the work of promoting safety may be carried forward, instead of being hampered by the construction of such "simple" lamp testers.

H. C. Brooks

COVENTRY

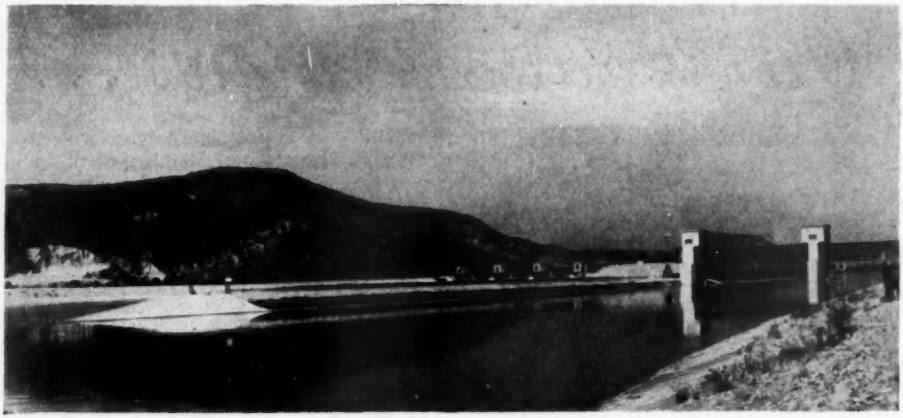
HAZARDS from STATIC ELECTRICITY

THE recent correspondence in our columns dealing with static from cars is given added interest by a communication from the Director of the National Bureau of Standards in America to the Journal of the Franklin Institute. In this communication, the Director points out that the increasing industrial importance of static, used with beneficent results in such processes as ore separation and paint spraying but constituting a distinct hazard in other industries such as air-conditioning, explosives manufacture, grain and flour storage, textiles and printing, has led to the Bureau undertaking a research and standardisation programme on this subject.

The results of one important phase of this programme, an investigation into the conductivity of floor coverings, are already being used to reduce hazards in hospitals and in Federal munition plants. This work is, however, only being conducted for Federal and other government agencies.

Results show that a fairly high resistance, one megohm or less, is ample for this purpose. Many floor materials change in resistance value with the potential applied. A determination of the upper safe value of resistance showed that voltages as high as 5,000 can be developed from the simple act of getting up from a plastic-covered chair. If, however, the resistance between chair and individual is less than 20 megohms, the voltage will not exceed about 300.

The Report goes on to point out that many accidents do not arise from the direct shock but from secondary effects when the discharge takes place subsequently. Several methods of reducing static were suggested, and as long ago as 1942 the Bureau published a circular (N.B.S. Circular 438 "Static Electricity") which outlined the problems and suggested solutions that were still useful today.



The Donzère-Mondragon Scheme

By ROBERT W. NEWBY, A.M.I.E.E.

ON the eve of the official opening of the Donzère-Mondragon barrage and hydro-electric station in the Lower Rhône Valley, a visit to the scheme was paid by delegates to the recent Technical Congress of the Institut National de Sécurité held at Avignon from October 9 to 12.

The scheme is well advanced and, although the station itself is still far from completed, it is to be opened by the President of the French Republic, Monsieur Vincent Auriol, on Saturday, October 25. It forms part of a great project for the utilisation of the waters of the Rhône that is gradually being put into effect by the Compagnie Nationale du Rhône and which has three aims: to produce electric power, to improve navigation on the Rhône so that larger vessels can penetrate as far as Lyon, and to provide irrigation in the Rhône Valley.

It must necessarily be many years before the whole series of proposed hydro-electric stations can be completed, but those in the first part of the programme, at Génissiat and Seyssel on the Haut Rhône, have been in operation for some time—Génissiat generating over 1,500 million kWh annually.

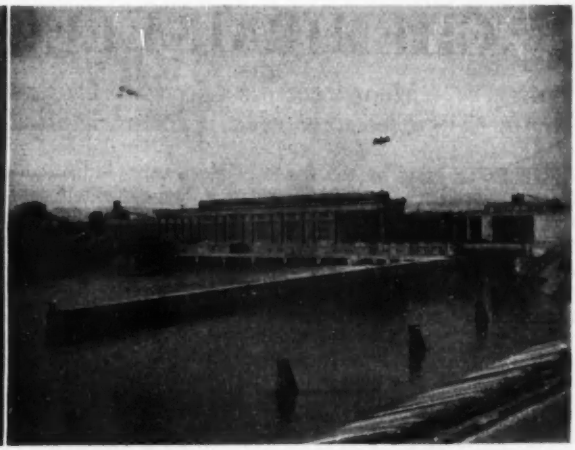
The Donzère-Mondragon scheme is gigantic in conception and has involved the provision of a ship canal 475 ft wide and over 17 miles long, which short-circuits some 20 miles of the original course of the river. The lock, 640 ft long and 39 ft wide, at the André Blondel hydro-electric station near Bollène, with a fall of 85 ft, is said to create a world record. The speed of filling and emptying the lock chamber (4½ ft per minute) is well in excess of anything hitherto achieved.

The site near Bollène for the hydro-electric station itself was chosen so that the foundations could be upon rock. There will ultimately be six 50,000 kW sets running at 107 r.p.m., the generated voltage being 10·5 kV. Power is supplied at 60 kV for the Lyon-Marseille electric railway system and at 220 kV to the French national grid network. Although the station itself will be barely half finished at the time of the inauguration by the President, conclusion of this section of the Rhône scheme is now within measurable distance, as the heavy civil engineering work is all but complete. Two of the generating sets are in use and a third is now undergoing test.

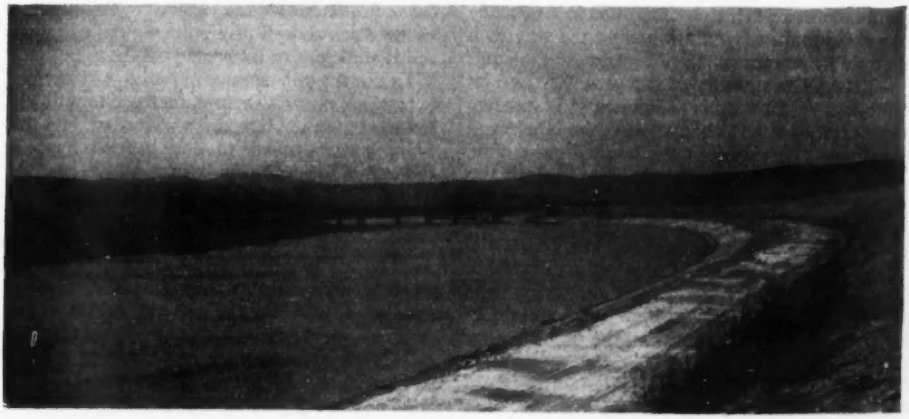
Technical Congress

The Congress at Avignon, under the presidency of Monsieur A. Texier, was attended by some 650 industrial safety engineers, medical officers, government representatives and industrialists. There were 18 foreign delegates from Belgium, Germany, Great Britain, Holland, Italy, Spain and Sweden.

Fifty papers were presented and discussed, covering various aspects of work in the industrial field for the prevention of accidents and occupational disease. These included a number whose authors had studied the practical and medical effects of different forms of electric lighting for various industrial surroundings, and their effect on the safety and well-being of the worker. The use of fluorescent lighting was covered with particular care.



On the opposite page is shown the junction of the navigation and power canals. Above left, is a view of the turbine room under construction, while on the right is a general external view of the power station. The size of the navigation lock can be judged from the picture on the left, while below, the view of the canal gives some idea of the immense size and scope of this hydro-electric project



CHEMICAL ELECTRICITY

Measurements Section Chairman discusses Electrical Measurement applied to Chemistry

SUBJECTS lying on the fringe of electrical measurement provided a stimulating theme to the address given on Tuesday by Dr. L. Hartshorn, D.SC., M.I.E.E. (National Physical Laboratory), new chairman of the Measurements Section of the Institution of Electrical Engineers. Yet, as he reminded his audience, the association of chemistry with electrical measurement has been longstanding as exemplified by the standard cell, which is one of the oldest and simplest implements of the measurement engineer's craft.

Dr. L. Hartshorn

Few engineers realise how accurate is this most useful tool, the standard cell. Its action and construction ensure an electrically active, chemically reversible system of considerable chemical stability. Moreover, its usefulness as a standard depends on its chemical properties and hence it must be constructed with materials of absolute purity. This is an ideal impossible to achieve, but the closeness which is being attained in practice is shown by the remarkable constancy of the cell.

Liquid Enemy

Turning his attention to what he described as Public Enemy No. 1, Dr. Hartshorn discussed the measurement of moisture in gases and vapours. Developments by Dr. Essen, with a microwave generator controlled in frequency by a resonant cavity, are paving the way to a simple measurement of gaseous moisture content. The stability of the generator and its frequency control is sufficient to indicate accurately small changes in the dielectric constant of the gas in the controlling cavity, changes caused by variations in its humidity.

One of the recurrent factors linking electricity, water and chemistry is the elusive quantity pH, which to chemists means "the concentration of hydrogen ions." A recent standard B.S. 1647:1950 defines pH as a function of the e.m.f. of a specified voltaic cell, containing a solution of that pH value, the cell having a hydrogen cathode.

In constructing this cell, the N.P.L. and similar bodies have used platinum black, which has the property of absorbing hydrogen. For industrial purposes, however, glass of high alkali content is found to be more effective. Hydrogen ions are present in the glass cathode in the water absorbed by the glass, so that the requirements of B.S.1647:1950 are met.

Another form of primary cell applied to measurement is the oxygen meter in which the distinctive feature is a "dropping-mercury" electrode, to ensure it is kept constantly clean. This electrode is immersed in a highly conducting electrolyte through which gas containing oxygen is bubbled. Its potential is sensitive to oxygen dissolved in the electrolyte, providing an accurate means of measuring the concentration of any present in the gas.

The Polarograph

An instrument, similar in many respects to the oxygen meter, is available for use as a chemical analyser solely by electrical means. This instrument, the polarograph, retains the mercury dropping cathode and highly conducting electrolyte to which is added the solution under test. Unlike the oxygen meter, however, the cell is electrolytic and is not used as a primary source of e.m.f.

Its action relies on the potential barrier which exists between positive metallic ions and the mercury cathode, a barrier which differs for ions of different metals. Current will only flow in the electrolyte if the voltage applied to the cell is sufficient to overcome this barrier.

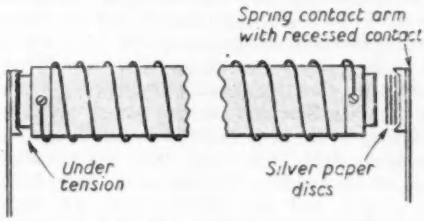
To use the polarograph, a voltage is applied across its electrodes and increased until the lowest potential barrier is exceeded. At this point current starts to flow carried by only those ions for which no barrier now exists. As the voltage is further increased the current rises rapidly to a maximum value, limited by the relative scarcity of those ions in the electrolyte. The current/voltage curve of this operation thus takes the form of a step function, identifying the ion carrying the current and indicating its concentration. Other ions present in the electrolyte are determined in a similar manner by merely increasing the voltage across the cell and obtaining further current steps as each barrier is exceeded.

Problems and Practice

IN ENGINEERING

Electric Fire Contacts

IN answer to the problem of "Electric Fire Contacts" in the issue dated October 2, if Mr. W. Adam will file and clean the contact faces of the rod element type fire; then make three or four blank discs from good quality



Position of silver paper discs to cut down burning and pitting in electric fire contacts

"silver paper", to be placed and held in position by the spring contacts, I think that he will find that the burning and pitting will disappear. The diagram illustrates the placing of the "silver paper" discs.—*N. M.*

Coil Band Heating Prevention

WHEN rewinding any alternating current or direct current rotor on which steel or bronze wires are used to retain the rotor coils in position, it is important that the methods employed to band the original factory winding be carefully studied and the data recorded in detail, so that, when rebanding, band heating or losses are kept at a safe value.

There are a number of details which affect the heating of bands. They are: (a) the width of the bands; (b) materials used for clips; (c) spacing of clips; (d) use of tie clips, i.e. clips used to anchor the coil and bands to the last core band; (e) number of layers of wire per band; and (f) grade, size, and type of banding wire used. The combination of these details in any armature determines the amount of band heating. In the following remarks safe practice will be described for each section so that in the absence of factory data any type of armature can be safely banded.

Briefly, band heating is due to eddy currents and hysteresis loss. Hysteresis loss is proportional to (1) the frequency, (2) the flux density, (3) the volume of material magnetised, and (4) the hysteresis coefficient of the magnetic material used for banding.

Eddy current losses are proportional to (1) the square of the flux density, (2) the conductivity of the wire and clips, (3) the square of the frequency, (4) the volume of the magnetic material in the bands.

Of the factors mentioned above that affect band heating, only those that relate to volume and characteristics of the banding materials and frequency can be altered during rebanding or rewinding. The frequency is altered when the motor is rewound for a different speed, and the others are changed when any departure is made from the original structure.

Width of bands has a great deal to do with band heating. It is a safe rule to limit the width of core bands to $\frac{1}{2}$ in. or $\frac{3}{8}$ in., using two or more sections insulated from each other when a wide band is necessary. The object in sectionalising bands is to reduce the volume of solid material in the same way that large conductors are stranded and cores are laminated to reduce eddy currents.

When in doubt, it is safer to insulate all core bands from the case, divide the bands into sections and insulate between the layers of multi-layer bands. These three ways are of major importance in reducing band heating.

Clip material should be tinned sheet steel except in the case of small bands because its conductivity is low as compared to that of copper. Spacing of clips should be such as to provide sufficient mechanical strength without affecting band heating.

Tie clips used to anchor adjacent bands together will cause excessive band heating if not properly insulated. The metal strips used to tie adjacent bands together form a squirrel cage winding. The greater the number of tie clips around the circumference the greater will be the eddy currents in the bands and the heating will be in proportion.

Multi-layer bands should be insulated between layers with either asbestos tape or mica if there is any fear that the operating conditions may be such as to cause band losses. For the majority of cases the wire used for banding should be high grade tinned steel. Tinned bronze wire is used for high speed units or

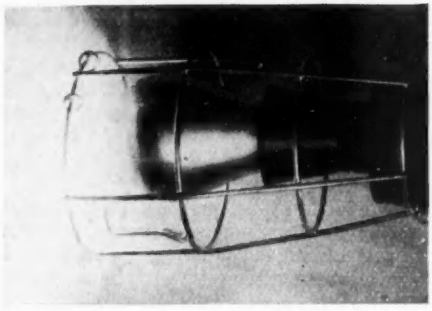
where the operating conditions may cause high band losses. When bronze wire is not available or is not considered desirable it is possible to employ tinned steel wire. Use a wire half the size of that normally used, and make a two-layer band insulating between layers. The band may also be divided into sections.

From a practical viewpoint the prevention of excessive band heating involves segregating the bands so that each section contains a very small amount of active magnetic material, and avoiding cross connection of bands in a manner that will permit circulating currents to be generated. When increasing motor speed it is a safe rule to sectionalise bands if the increase exceeds 25%.—"*Works Engineer.*"

Hand Lamp Glare

MAINTENANCE men and erectors of heavy machinery often have to work for prolonged periods in dark situations and the hand lamp in the illustration is very popular for illuminating the working area. The lamp is sufficient for its purpose but has the defect of being unshaded and the glare resulting from it causes eyestrain, impaired vision and fatigue in the user.

A simple and efficient way of shading the lamp is to paint the exterior of the glass with heat-resisting aluminium paint. Several coats of this paint are opaque to light, but since the paint has reflecting properties, maximum illumination from the filament will pass through the unpainted portion of the glass.



The coatings of paint have effectively reduced the glare from the lamp

The parts of the bulb to be painted, and therefore shaded, can be varied to suit the individual user. For instance, half the bulb circumference may be shaded by painting so that the light will shine out horizontally when the lamp is stood on the ground or hung up vertically. An alternative method of shading, favoured by the writer, is shown in the illustration. In this instance, the whole of the bulb exterior is painted, with the exception of the hemispherical bulb end. The effect is self-evident. When the lamp is hung vertically, the light shines downward upon a horizontal working surface. When held in the hand, the illumination is similar to that obtained from an electric torch. Whichever shading method is used, the increased comfort is marked.—*C. T. Bower.*

Commutator and Slipring Turning

AFTER repairs to armatures and/or commutators the opportunity to true the commutator or sliprings by skimming in a centre lathe is usual practice. When the armature is first positioned between the lathe centres it is advisable to check by micrometer clock gauge the bearing journals, for these will frequently be found to appear out of true by sometimes as much as 0·010 in., due in most cases to distortion of the shaft centres after pulley or bearing drawing tools have been employed, and particularly when the withdrawal has been stubborn. In such cases the shaft centres must be cleaned and adjusted until the bearing journals are true otherwise the commutator after turning will run eccentric when the armature is replaced in its bearings, with consequent radial movement of the brushes in their boxes when the motor is running, a worse condition possibly than before the commutator or sliprings were turned.

If, after turning, the commutator bar edges have dragged over the mica sections, they should be carefully scraped clear until the mica shows white, and when the mica is recessed the bar edges should be slightly bevelled. It is usual after an armature repair to carry out a bar-to-bar potential drop test round the commutator which reveals short circuits, open circuits or defective joints.—*T. H. Snelson.*

Cleaning Threads

CONDUIT continuity can often be seriously impaired by using couplers in which threads are clogged with enamel. On one occasion the difficulty was overcome without a pipe tap by using a hastily improvised length of screwed conduit. Four saw cuts were made longitudinally over the screwed section. This "tap" was then screwed into the coupler, the saw cuts providing channels for enamel removed from the threads.—*S. B.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

Automatic Metering

A method of obtaining proportional injection of chemical solution into boiler feed water

By F. J. HALLIGEY, A.M.I.E.E.

AT a recently-erected industrial power station, equipped with two 24,000 lb/hr. water tube boilers operating at a pressure of 375 lb/sq in., automatic control of injection of chemical solution into the feed water was achieved in the following manner.

A small reciprocating chemical injection pump was available, driven by a f.h.p. motor, and it was decided to arrange for this to run so that the quantity of solution injected into the feed suction line was proportional to the flow of feed water, thus tending to preserve a given concentration of treatment chemicals in the water at all times.

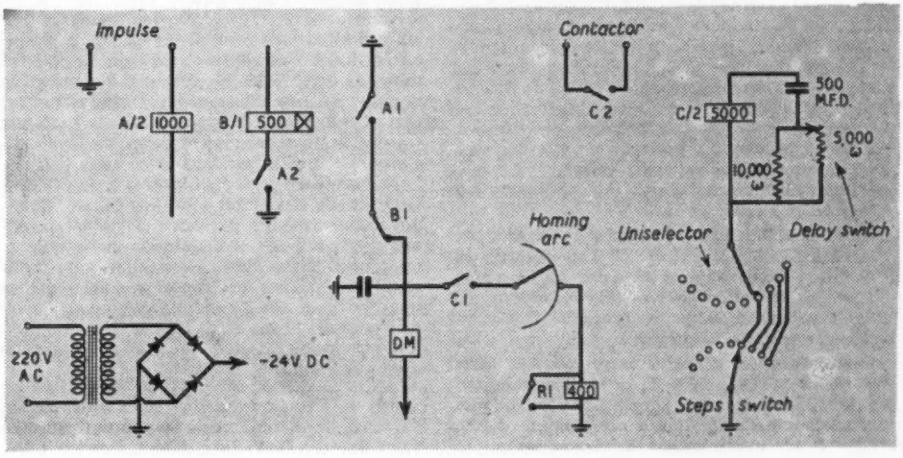
A vane-type water meter was fitted into the feed suction line, and the gear train, in addition to operating the counter mechanism, was arranged to rotate a small cam which tilted a mercury switch once per revolution. This mercury switch was used to cause operation of the injection pump motor, but it is important to realise that although at low rates of flow of feed water the mercury switch would operate infrequently, it could not be directly applied to control the pump motor because the length of the periods when its circuit was closed would be longer when it was running slowly than when it was running more rapidly. Consequently, the mercury switch was used only to provide current impulses at the moment of closure, which were fed into a controller constructed of a telephone-type uniselector and relays as indicated in the illustration.

Method of Operation

After a pre-selected number of impulses is received (irrespective of the length of the impulses) a circuit to the contactor operating coil of the pump motor starter is made, and the pump starts, continuing to run for a period determined by a delay relay circuit in the controller mechanism. The time of operation of the pump for any given flow of feed water can thus be varied between very wide limits.

Referring to Figure, when the external impulse contact closes a circuit is made for relay A. Contact A1 closes the circuit for the driving magnet DM of the uniselector via contact B1. Relay B is operated through contact A2, but being of the delayed operation type, it will operate slightly later and with contact B1 disconnect the driving circuit. Thus the driving magnet receives a current impulse of predetermined length and independent of the length of time for which the external impulse contact (i.e., the mercury switch) is closed.

Arrangement of telephone type circuits controlling injection



The uniselector therefore takes one step for each external impulse. To its contact bank is connected the Steps switch, which marks the selected position by an earth. When this position is reached, relay C operates, contact C2 closes, and the external circuit to the operating coil of the motor contactor starter is made. Contact C1 connects the driving magnet, via the homing arc, to the relay interrupter R1, which drives the uniselector home. In the home position this driving circuit is interrupted, and the uniselector stops ready for the next series of impulses.

The release of relay C is delayed by the 500 microfarad condenser and variable resistance in parallel with its coil. Varying the resistance adjusts the release time, at which moment of course the pump motor stops. Contact C2 is rated at 3 amps non-inductive load, which is an ample allowance for the operating coil circuit of a small contactor starter.

Power supply to the controller is derived from 220 volt a.c. mains, through a transformer and bridge selenium rectifier delivering 24 volts d.c.

The pump suction is connected to a chemical mixing tank of approximately 100 gallons capacity, and the rate of addition of chemical to the feed water can be varied in three ways, namely by adjustment of the controller to operate the motor after the mercury switch has closed for a given number of times (each closure representing the flow of about 15 gallons of feed water), by adjustment of the delay switch to cause the motor to run for a period variable from about 5 to 30 seconds, and by alteration to the concentration of chemical solution in the tank. In practice, these adjustments are made in accordance with the results of routine tests of the boiler water. Such tests are normally made daily, but after the initial adjustments were made on installation of the apparatus, very little further adjustment was found necessary for long periods provided normal cyclic operation of the station was unchanged.

The apparatus is mounted in a dust-proof metal case, erected at a considerable distance from the pump in a clean situation. A further refinement is the inclusion of a red indicating lamp, connected in parallel with the contactor operating coil circuit, which by lighting up at intervals informs the plant operators that the pump is running regularly.

BRITISH STANDARDS

Bayonet Lamp caps, Lamp holders and Lamp-holder-plugs (B.C. Adaptors). For Voltages not exceeding 250 V. *B.S.* 52: 1952. *Price* 5*s*. This standard is not a full revision, but has been undertaken to give effect to certain changes in practice and to take account of international agreements arrived at by the International Electrotechnical Commission. The opportunity has been taken to include additional types of bayonet caps which are used in the automobile industry. The tables have been enlarged and now give the metric equivalents of the dimensions previously quoted in inches only.

This standard now specifies the principal dimensions of lamp caps, lamp holders and lamp holder-plugs (B.C. adaptors) and gives information on dimensions, screw threads, union rings, plungers, terminals, protecting devices, etc. It includes appendices dealing with the interior of lamp-holders, recommended gauges for lamp-caps and holders and protecting devices.

Lead/Acid Batteries (non-aerobatic) for Aircraft. *B.S.* 2*G*.131: 1952. *Price* 2*s*. This revision of B.S. G.131 has been prepared to provide for a high discharge rate battery and an alternative terminal arrangement. In other respects the standard remains essentially unaltered.

Dimensions of prefocus lamp caps and lamp holders. *B.S.* 1164: 1952. *Price* 3*s*. This standard applies to lamp caps and lamp holders for voltages not exceeding 250 V. It is a new edition of B.S. 1164, revised to implement the recommendations of the International Electro-technical Commission, and now includes details of British and small prefocus caps P22/21 and P15/19 respectively. Also covered in the Standard are dimensions, recommended gauges for lamp caps and lamp holders, and drawings for all caps and holders are given.

Flexible Steel Conduit and Adaptors for the Protection of Electric Cable. *B.S.* 731 *Pt.* 1:1952. *Price* 2*s* 6*d*. This standard forms part of the revision of B.S. 731, which was issued in 1937. Since flexible steel conduit for electric cable protection has become dissociated from flexible steel tubing to enclose flexible drives, this standard has been given a new B.S. number; the revision of the part of B.S. 731 relating to flexible steel tubing to enclose flexible drives will form the subject of a separate British Standard to be published later.

This standard provides for three types of flexible steel conduit suitable for insulated cables—unpacked, asbestos packed and rubber packed, and for two types of adaptors—clamp type and solid type. In addition to standardising dimensions, it specifies mechanical requirements and tests for the finished conduit, and prescribes suitable qualities of materials for use in the manufacture of flexible steel conduit and adaptors for cable protection.

British Standards described above may be obtained from the British Standards Institution, Sales Branch, 24 Victoria Street, London S.W.1.

Designing Single Phase Motors

—NEW MACHINE TO ELIMINATE CALCULATION DRUDGERY

SINGLE-PHASE motors used in portable and fixed machine tools, domestic appliances and similar equipments comprise the large majority of electric motors being made today. Yet performance calculations made on them are more involved and more time consuming than similar calculations for polyphase machines. It is not surprising, therefore, that attention has been directed toward the development of analogue computors for eliminating this work. One of the latest of these machines

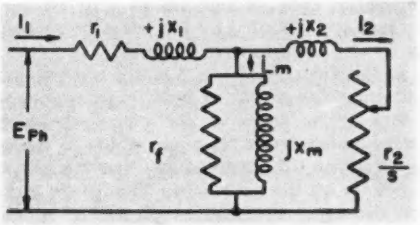


Fig. 1.—Equivalent circuit of polyphase induction motor

is the "Moneca," described in the September issue of *Electrical Engineering* by Mr. C. G. Veinott. The reason for developing the analogue machine in preference to the digital type is that the motor circuit can be reproduced directly on the former type, and if the operator wishes to change the value of one or more constants, the effect of these changes can be seen instantaneously. Thus the analogue type is undoubtedly faster for most engineering applications, and although the accuracy is somewhat less than that of its digital counterpart, it is probably greater than that of many of the constants involved and may even be better than the accuracy of test of the completed motor.

Basic Circuits

The classical equivalent circuit for the polyphase induction motor is shown in Fig. 1. Watts lost in the resistor (r_2/s) multiplied by the number of phases is the output torque, expressed in synchronous watts. The input to the network is the motor input per phase, the loss in r_f is the iron loss per phase and the voltage across it is the voltage induced by air-gap flux.

An equivalent circuit for a single-phase motor based on the revolving field theory is shown in Fig. 2. In this particular method a modification has been made in the method of representing iron loss. This is represented in Fig. 2 for both forward and backward fields by two resistors bridged across the mutual reactances for the two fields. Handling the loss this way, while theoretically correct, is somewhat cumbersome. However, by adding supplementary resistors $r_f/2$ it is possible to adjust them to correspond to the iron loss. Thus in Fig. 2 the loss in resistor $0{\cdot}5\ r_2/s$ is the forward field torque, and the loss in resistor $0{\cdot}5\ r_2/2-s$ is the backward field torque. Similarly E_f and E_b represent the voltages induced in the stator winding for the forward and backward fields respectively.

The Motor

Now consider a single-phase motor with two separate and distinct windings in space quadrature as shown in Fig. 3. These windings

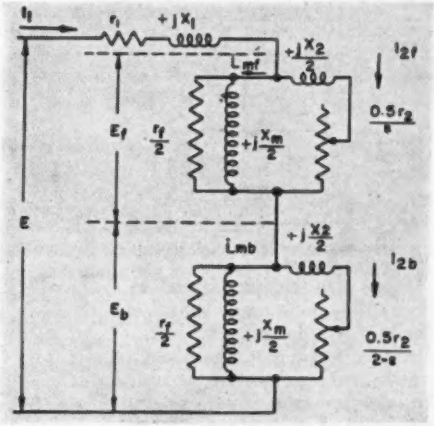


Fig. 2.—Equivalent circuit of single phase induction motor

do not necessarily have either the same number of turns or the same voltage impressed on them. Each winding, however, sets up two revolving fields, making four in all. Using the notation that K=ratio of effective turns in auxiliary winding to effective turns in main winding, and the suffixes "m" and "a" stand for main and

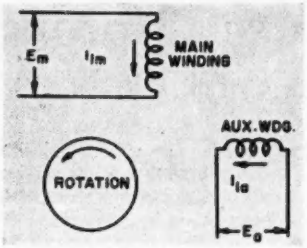


Fig. 3.—Symbols for single phase motor with two windings in space quadrature

auxiliary, while the suffixes "*b*" and "*f*" stand for backward and forward, we can derive the following simultaneous equations for the total voltage induced in each winding:

$$E_m = I_{1m}Z_{1m} + I_{1m}Z_f - jKI^1{}_aZ_f + I^1{}_mZ_b + jKI^1{}_aZ_b$$
$$E_a = I_{1a}Z_{1a} + I_{1a}K^2Z_f + jKI_{1m}Z_f + I_{1a}K^2Z_b - jKI_{1m}Z_b$$

These are the two fundamental simultaneous equations for the capacitor motor developed by Morris, although the notation is slightly different.

Rewriting the equation to combine terms we get:

$$E_m = I_{1m}Z_{1m} + (I_{1m} - jKI_{1a})Z_f + (I_{1m} + jKI_{1a})Z_b$$

and then by multiplying this by $-j/K$ we derive

$$-jE_a/K = jKI_{1a}Z_{1a}/K^2 + (I_{1m} - jKI_{1a})Z_f - (I_{1m} + jKI_{1a})Z_b.$$

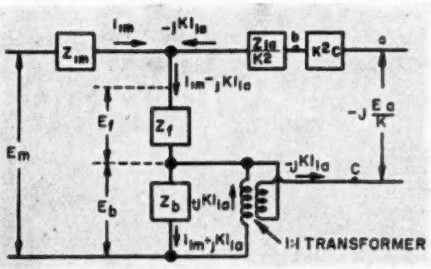


Fig. 4.—Representation of equation electrically

These can be reproduced by an equivalent circuit as shown in Fig. 4. It represents the single-phase induction motor with windings in space quadrature, because the simultaneous equations for the solution of this network are the equations given above. The circuit in Fig. 4, is, therefore, the fundamental circuit around which the calculator "Moneca" was designed.

The Calculator Itself

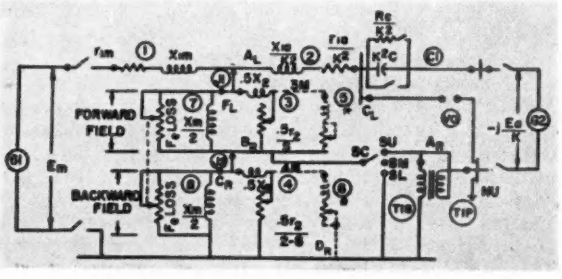
Although the basic circuit is given in Fig. 4 the actual calculator is somewhat more elaborate, and a schematic is given in Fig. 5. One set of electronic low loss readings is used for all circuit measurements. Two voltage sources are provided and the voltage and phase of these circuits can be controlled independently. Switches enable the instruments to be connected to any desired circuit, and metering control switches enable any one of three voltage scales and of five current scales to be selected. These switches also control wattmeter polarity and likewise permit use of the wattmeter to read watts or vars, or either amperes or volts in vector form, giving the answers either in rectangular or polar co-ordinates. All dials and controls are available to one operator while sitting in his chair, and since the magnetising reactance is seldom changed in the course of a motor performance calculator, most computations can be performed and recorded by the operator without his having to move from his chair.

In the diagram of Fig. 5 it will be seen that certain points are shown with ringed numbers. These points represent the places at which meter readings can be taken, which represent practically all the data of any machine which is set up on the calculator. The article gives the details of the method of setting up the machine and a practical example is worked out to illustrate this.

It should, however, be pointed out that although the calculator circuit will give many direct readings, certain design requirements may have to be derived. For example, line amperes on the starting connection cannot be obtained directly.

Speed of computation is estimated to be two to ten times as fast, or even more, as longhand calculation, and the more complex the calculation the more advantage "Moneca" possesses. The principal value of the equipment, however, lies in the making of combined winding calculation of single-phase motors.

Fig. 5.—Circuit diagram of calculator showing metering points which are ringed in circles



HOME AND EXPORT

Support for Manufacturers called for in A.S.E.E. Address

ELECTRICITY'S place in the nation's welfare provided a subject for Mr. C. T. MELLING, M.SC.Tech., M.I.E.E., M.I.Mech.E., when he delivered, on Tuesday last, his presidential address to the Association of Supervising Electrical Engineers. He treated his theme under two main headings: support for export activity and the development of fuel policy in the light of the Ridley Committee report.

Apart from the most important aid it can give to the export programme by increasing productivity at home, the electrical manufacturing industry has a direct part to play in swelling the volume of exports. It fulfils the necessary conditions of a desirable export industry not only by the increased volume of exports it is achieving, but also by its relatively high surplus in terms of imported material in many of its products.

Sales Talk

The development of the necessary skills in the electrical industry depends to an important extent upon experience in the operation and maintenance of new machines under working conditions. Salesmen can find one of their best arguments in the proved reliability and efficiency of plant operating in Great Britain. From this it follows that close examination should be made of world markets as a means of determining which developments should be encouraged in the home market.

In the heavy electrical engineering field, the B.E.A. is effectively providing a proving ground for manufacturers by its decision to supplement the existing grid by another operating at 275kV with a possible extension to 380kV. This is a wise move not only in its value to the electricity supply industry but also in providing at home a market for electrical manufacturers whose exports may be further expanded by such developments.

Another example of this sort of co-operation is the joint decision of the B.E.A. and two turbine manufacturers to construct and operate gas turbine sets near to the manufacturers' works, so that designers, manufacturers and users should obtain the necessary operating experience in the application of gas turbine technique in the large scale generation of electricity. In due course this experience may result in valuable export orders.

This general rule applies not only to heavy engineering products, where it is in this way being observed; but also to electric domestic appliances, many of which have an export outlet. National planning bodies concerned with improving the export position should not ignore this fact. Many countries have, unlike Great Britain, by-passed gas as a domestic fuel, and gone straight to electricity. Consequently there are greater export possibilities for electric cookers, water heaters, refrigerators and room heating appliances than for the corresponding gas appliances. There are certainly greater possibilities for electric heaters than for solid fuel grates.

"We cannot," said Mr. Melling "expect foreign buyers to be impressed with our electrical manufactures if we, in this country retain the older methods of providing domestic heating in its various forms." As a corollary, there should at least be equality of treatment for the exporting industry with its competitors in purchase tax and the commercial activities of advertising and salesmanship in the home market.

Freedom of Choice

Shortages of generating plant and of coal are of course understandable reasons for modifying freedom of choice, but it is now justifiable to encourage the greater use of domestic electric appliances, particularly as they add greatly to the load factor while adding relatively little to peak demands. On the coal conservation question, the Ridley Committee report provides an authoritative statement.

This report Mr. Melling described as "the most thorough examination yet made of this subject," and he noted with special approval its recommendation that the consumer should be allowed freedom of choice in fuel using appliances. Discussing some of the matters it raised generally, he emphasised that the fall in efficiency below the optimum value of domestic appliance when in use is likely to be far greater than in the case of, say, a steam turbine. With power station design suggesting as possible efficiencies of 38% or more, this is an

important consideration. It has to be remembered that with high efficiency domestic grates the appropriate grade of fuel will not always be used, and that they will certainly not always be stoked as in the laboratory.

Electricity is specially well suited for use in specialised appliances having automatic control, and these can be very efficient. If engineers continue to improve power generation, transmission, distribution and utilisation, then it is probable that within a few years what is achieved will convince doubters that the electrical method is generally the most desirable on grounds of coal utilisation.

Tariff Structure

Tariff structure in the electricity industry, the subject of much comment and some criticism by the Ridley Committee, has for long been in keeping with costing principles. If, however, it is decided that price discrimination should not be general, but should be applied in detail, then complications arise. Electricity peak problems are now much less pronounced than formerly, and during the last 25 years the load factor has increased from about 30% to approximately 50%. This compares with a load factor of about 20% for the machine tools and similar capital equipment of a modern factory.

In spite of the good load factors achieved in relation to general industry and the improvements which have been made, there is much scope for further improvement—tariffs, non-firm supplies, the design of improved off-peak appliances, and the removal of purchase tax from appliances which improve the load factor. In considering all such improvements, however, it is necessary to keep constantly in mind that for every supply and for every individual application, electricity is always a means to an end. Improvements in load factor which are due to interruption of the service given by electricity are not improvements from the consumers' viewpoint.

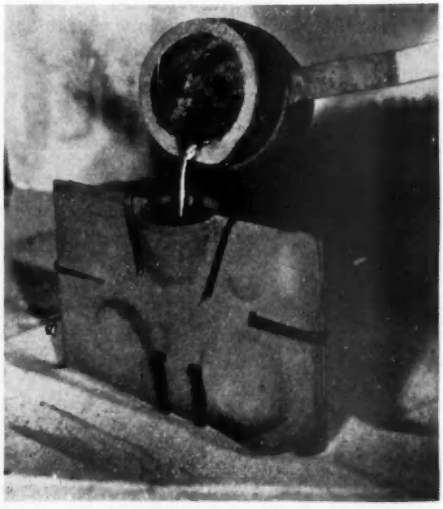
In conclusion, Mr. Melling emphasised that all his audience would know from experience other ways of which electricity will continue to show itself as "the most versatile, the most convenient, the cleanest and the most easily transportable of all fuels."

Synthetic Resin Moulds

A NEW method of making foundry moulds and cores, using a mixture of sand and "Bakelite" synthetic resin, has been developed from the war-time invention of a German foundry proprietor, Herr J. Croning. A special grade of thermo-setting resin has been produced by Bakelite Ltd. for this purpose.

To prepare moulds, powdered resin is mixed with sand in suitable proportions, and the mixture spread over a heated metal pattern. Heat from the plate hardens the surface of the powder, forming a thin crust, and additional heat is then applied to harden the whole layer. The resultant shell is used as a half-mould, being clamped to a similar shell by clips, bolts or soft nails to form a complete mould ready for pouring. Although sufficiently rigid for accurate casting, moulds can be quickly broken down, eliminating knock-out.

In general, the method is suitable for either complicated or simple patterns and lends itself to mass-production. Another important factor is that the material combines strength with lightness, so that moulds can be stored until wanted. Moreover, the cleaner finish given by this material permits working to closer tolerances, thus reducing the cost of machining the finished casting.



Simplicity of clamping and the thinness of the mould are well shown here

GLASS, CABLES and FUEL

I.E.E. Centre Addresses Cover Wide Range of Interests

AN interesting and enlightening account of the development of modern techniques in the manufacture of sheet glass was given by Mr. W. A. Hatch in his chairman's address to the Mersey and North Wales Centre of the I.E.E. recently. He began by stating that there was evidence that glass had been made several thousand years ago, and that coloured glass for ornamental use was plentiful in Egypt about 1500 B.C. The first sheet of glass made in this country was produced at Chiddingfold in the Weald in about 1226. This was made by the crown process of blowing which produced a flat disc of glass with the characteristic bull's-eye or bullion in the centre.

In 1840 the hand cylinder process became general due to the fact that larger sheets could be produced, and this in turn was superseded by the "cylinder-drawn" process which produced cylinders of glass 30 in. in diameter and up to 40 ft high. The cylinder was then split and flattened. The glass produced by this process was never really flat and the uneven surface produced distortion of vision. By 1926 the process had so far developed that a flat sheet could be drawn direct from a bath of molten glass.

Glass-making

The essential preliminary to glass-making was the correct mixing of the raw materials. A large handling, weighing and mixing plant was necessary for this in a modern works. The raw materials—sand, soda ash and limestone—were automatically mixed using central control with only one operator. The controls were mechanical and electro-pneumatic and involved some 200 progress signal lights and many interlocks to prevent incorrect batching and dependence on the human element.

Three melting phases occurred. In the initial melt a chemical reaction took place between the three ingredients, resulting in a sticky mass of bubbles. In the next stage, a fining operation took place when the temperature was raised and the glass lost its viscous nature and became quite watery, thus allowing the bubbles to rise to the surface and the glass to clear. Finally it was cooled down to a temperature at which it could be worked.

From the output end of the furnace the glass passed into a drawing kiln or channel and was drawn up in the form of a sheet by means of a series of electrically driven asbestos-covered rollers, mounted in pairs in an annealing tower. At a height of about 30 ft above the kiln, it was sufficiently cool to be cut off.

Flat drawn sheet glass could be made in thicknesses ranging from 18 oz per sq ft up to 32 oz per sq ft, depending on the speed of drawing, which called for fine motor control over a range of 10 to 1. Continuity of electricity supply was essential as a breakdown for only a few minutes could disorganise the process for 24 hours or more. For that reason an emergency battery standby plant was installed with a changeover switch.

The nature of the process was such that the electrical input to each machine was small, only about 750 W, yet this enabled glass to be produced at a most rapid rate. Auxiliary electrically driven plant for cooling the furnace walls was, however, considerable, and it was a regrettable feature of glass manufacture that the thermal efficiency of a large glass furnace was only about 15%.

Electrical heating of the glass by conduction had been tried, but was not commercially attractive unless electrical energy could be obtained at very much less than one penny per unit. This could only be possible by locating glass-making works near water power as in Canada at the St. Lawrence seaway project, where electricity would be available at about five units per penny, or at Owen Falls.

In conclusion, Mr. Hatch suggested that the Severn Barrage scheme might alter the picture, or perhaps Scandinavian power might become available in this country. In the long run, he thought, hydro power should prove cheaper than coal.

Saving in Fuel

As the Scottish Centre's chairman, Mr. J. S. A. Primrose, M.I.E.E., did not give an address this year, attention has been focused on those given at the sub-centres in South West and South East Scotland. The South West sub-centre held its opening meeting recently, at which the chairman, Mr. C. H. A. Collyns

presented in his address, a review of electricity's place in the national economy.

Pointing out the need for greater productivity Mr. Collyns continued by discussing more efficient methods of utilising coal without undue waste of man-power. There were many hours spent on delivering coal to domestic consumers in Scotland alone, apart from fuel consumed in the process. Surely, the saving in man-power resulting from a greater use of electric energy by these users would be in the national interest?

Arguing that space heating by electricity could be as economical as other means, various ways in which this could be successfully accomplished were discussed. Radiant heating received special mention, being shown as equally suitable for industrial and agricultural applications.

In the neighbouring sub-centre in South East Scotland, a less provocative theme was chosen by Mr. J. S. Hastie, B.Sc.(Eng.), M.I.E.E. Tracing the development of high voltage cables from the early work of Ferranti, he indicated the extent to which both the first world war and the inception of the Grid system had acted as a stimulant. Progress in insulation methods provided the backbone of the address, ranging from the belt type developed by Ferranti, through solid insulation designed for cables up to 33 kV, to modern oil and gas filled cables, of which the 380 kV type installed by the Swedish State Electricity Board was a notable example.

New Zealand Progress

AN all-out effort to keep pace with a load increase of 10% per year continuing at least until 1953 is called for in the report of the Minister in Charge of the New Zealand State hydro-electric department. His statement, which covers the report of the general manager for the year ended March 31, 1952, contains an expression of personal confidence in the ultimate future of geothermal steam as one of the power resources of the North Island.

In the general manager's report the main engineering item noted is the bringing into operation of Tekapo power station, with 25·2 MW of plant. Initial running of the turbine revealed a mechanical fault, and this delayed the loading of the station, but it was possible to carry out repairs on the spot. During 1952, State hydro stations generated a total of 3,040 m. units, and State fuel stations 172 m. units.

Generation in the North Island was 14% greater than for the previous year, and the load fell particularly heavily on the hydro-electric stations because of the shortage of coal. Combined hydraulic conditions were below average, and as a result stored reserves of water were excessively drawn down by the end of March, 1952. In the South Island the heavy demand was made more difficult to meet by a succession of troubles. Notwithstanding restrictions imposed because of these, over 7% more power was generated than in the previous year. The troubles referred to included the interruption of two 110 kV lines during a storm and the washing away of a diversion race supplying water to the Highbank power station.

Supply Statistics

Detailed supply statistics for the North Island show a maximum half-hour demand of 477·9 MW under reduced frequency conditions on July 10, 1951, compared with 435·1 MW under normal conditions the year before. In both cases the peak occurred between 5 and 6 p.m. Total generation during the year was 2,344 m. units as against 2,060 m. units, an increase of 13·7%.

At Maraeti power station two turbo-generators were completed, and work advanced on another, while work went on with the installation of 220 kV transformers.

Peak load on the South Island system was 199 MW, between 11.30 and 12 a.m. on September 6. In the previous year it was 190·6 MW. Total generation for the combined system was 991 m. units, an increase of 7·4% on the previous year's 923 m. units.

As mentioned above, the principal item of new construction was the commissioning of the Tekapo power station.

Finance

Gross revenue earned amounted to £4,544,306, showing an increase of £327,870 over 1950-51. Costs of generation and distribution increased by £202,962 up to £2,570,553. After all necessary provisions for depreciation, interest, loan redemption, etc., there was a deficit on the year's operation of £167,161. The principal reason for the deficit is given as the high cost of thermal generation and of the purchase of power from auxiliary plants, in relation to the cost of hydro-generated power.

Colour Light Signalling

Southern Region Completes Part II of London-Brighton System

TWO years ago, in our issue of October 19, 1950, we gave an account of the first stage in the conversion to colour signalling of the Southern Region covering the areas Battersea Park to Coulsdon North on the Victoria-Brighton line and Bricklayers Arms Junction to Croydon on the London Bridge-Brighton lines.

Stage 2 of this scheme came into operation on October 12 this year, when 11 signal boxes between Battersea Park and Streatham Common, containing 499 levers were abolished, and, in their place, were substituted three new all-electric signal boxes totalling 225 levers. These, in conjunction with 39 automatic sections, cover some 14¾ route miles and 46 track miles. The new signal boxes are Clapham Junction "B" (103 levers), Balham (43 levers) and Streatham Junction (79 levers). Included in the signal boxes are relay and accumulator rooms, stores rooms and maintenance staff accommodation.

The Stage 2 area now contains 125 colour light signals of the multiple-aspect long-range type and 20 junction indicators. The signal spacing provides for a 2½ min headway for following stopping trains. There are 103 point machines, mostly operated from 120 V batteries; 239 condenser-fed track circuits incorporating 290 impedance bonds; 1,000 core miles of signalling cable, 250 pair miles of telephone cable and 12 miles of 480 and 110 V distribution cable.

Miniature type individual levers are provided at all signal boxes, with all-electric interlocking. Behind each signal lever is repeated in miniature lights all aspects of the signal it controls. These indications can be red, one or two yellows or green. Behind each point lever is an illuminated "N" or "R," indicating the position of the points it controls.

Magazine train describers are provided between all signal boxes. These enable signalmen, merely by pressing an appropriate button, to advise adjacent signal boxes of the next train, its class and destination, there being an instrument at the "receiving" signal box with descriptions corresponding to those on the instrument at the "sending" signal box. The receiving instrument indicates the first, second and third trains, the indication automatically stepping up one as each first train is cancelled on passing the signal box. There are 18 sending and 24 receiving instruments, together with associated equipment.

The relay rooms house main transformers, fuses, rectifiers and all the control apparatus on which depends the safe operation of the system. The main signalling supply at each signal box is 480 V into the relay room from the Mechanical and Electrical Engineer's portion of the signal box. Local distribution is at 110 V, but all automatic signal and other major locations are fed at 480 V. The controlling relays, of which there are 760 in the various rooms, are on steel racks conveniently placed for observation, testing and changing. The fuse and cable termination panels, also of steel, are up to 24 ft long, and each fuse panel carries 500 to 700 fuses. One hundred and fifty miles of flameproof wire have been used in the signal boxes and relay rooms.

The old and the new. Clapham Junction "B" mechanical and electrical boxes

overseas news

Drastic Action in N.S.W.

Ordered as part of the general reduction in state spending in New South Wales considerable cuts in the construction of generating stations have been announced by the State Electricity Commission and the Railways Department according to recent reports.

Power installations under construction by S.E.C. and affected by the cuts include Hume hydro-electric project where construction has been stopped. This station was expected to generate 30 MW in 1955 and an additional 30 MW in 1956. Wallerawang project has been deferred for 12 months. This was scheduled as a 60 MW station on load in 1955. Equipment worth £3½ million ordered in England is now the subject of negotiations for deferred delivery.

Construction of transmission lines has been halted. Important lines affected include the Sydney-Newcastle-Wagga link.

The cuts are expected to halt construction work on the first phase of the railway electrification scheme between Sydney and Wallerawang. Railway Department power stations affected include White Bay where extensions to the station to increase its capacity by 50 MW by 1954 have been stopped and some 280 men have been dismissed. At Wangi construction rate is now 75% of its former rate. Fortunately, construction here will not be stopped because of the acute power position in Newcastle which has been receiving supplies from Sydney to help meet the local demand.

At Lithgow work will go on because of the advanced stage of construction. However, work on the installation of the first of three 7½ MW sets will proceed more slowly whilst the other two units have been deferred.

Western Australia Loan

To afford funds for the continuation of expansion in its system, the State Electricity Commission has floated a loan of £1,000,000 which carries interest at a rate of £4 12s. 6d. per cent.

The loan which opened on October 6 will be redeemed in ten years. Interest will be paid half yearly. Both principal and interest are guaranteed on the revenues of the Commission and by the Government of Western Australia.

The interest rate is the highest for a trustee security in Western Australia.

Tully Falls Full Load By 1980?

Mr. Riordan, Queensland Minister of Mines, said recently that the Tully Falls hydro-electric scheme would not be loaded to its effective capacity until 1980. He said that the scheme could be developed to have an installed capacity of 92,400 kW.

The plan was for the installation of seven generating sets. Two would be included in the initial installation and the others installed as required to meet the demand.

In answer to a suggestion from another member, Mr. Watson, who proposed an investigation of the North Johnson River with a view to a supplementary scheme, Mr. Riordan said that there was no necessity to make an early commencement with such a scheme.

Rhodesia's Railways

A step forward in the electrification of the Rhodesia Railways has been taken with the arrival from America of the first two of an order for six diesel-electric locomotives. By 1954 steam locomotives on the Umtali-Salisbury section are expected to have been completely replaced by this type of locomotive. Announcing this, a Rhodesia Railways official added that an order had been placed with a British firm for 23 diesel-electric locomotives, which are due to be delivered in 1954. These locomotives will supersede the steam locomotives on the Umtali-Salisbury sector.

Preparing for Take-over?

A proposal that the Winnipeg Electric Co. might be split up into three or four corporations to pave the way for the purchase by the Manitoba Government of the company's hydro-electric assets has been the subject of recent discussions. A Government committee has been studying a Cabinet-approved proposal for purchase of part of the company. The Government is interested in the company's two electric generating plants, transmission lines and possibly the retail distribution system, with a view to bringing them into the provincial power commission. Sale of electric power assets would leave the company with its transit and gas utility systems which it operates in the city of Winnipeg and surrounding districts, and which it may continue. A firm of auditors recently valued the company's two generating plants, transmission lines and distribution system in greater Winnipeg at $54,300,000, while that for the transit and gas systems and real estate was $16,150,000.

St. Lawrence Decision Soon

A decision on whether power projects can be launched in the international section of the St. Lawrence River is expected before the end of this year, the Hon. Lionel Chevrier, Transport Minister, stated a few days ago. The International Joint Commission, which rules on the projects, is to hold its last hearings at the end of October in Washington, and he anticipates a decision will be given shortly afterwards.

Power Survey

The Orillia Water, Light and Power Commission this week announced the engagement of the Power Corporation of Canada, a Montreal firm, to make a survey concerning the cheapest and best method of meeting the increasing power demands of the town. The question which it is hoped the survey will answer is whether Orillia should continue to obtain its power from its own municipally-owned system, or whether it would be to the town's greater advantage to come to some arrangement with the Hydro Electric Power Commission of Ontario.

Which Fuel?

The prospect of using Alberta's natural gas in the proposed Brandon steam power station for the Manitoba Hydro Electric Board has been the subject of discussion recently. Mr. J. Rennie, projects engineer to the Board, has said that the question of whether coal or this natural gas would be used at the proposed station would be determined within the next few months. The matter has also been the subject of discussion between members of the Board and the Manitoba Cabinet.

Expansion in N.S.

The Nova Scotia Light and Power Co.'s fifth generating plant on the Black River went into production recently, marking completion of the province's largest hydro-electric river development. Premier Angus L. Macdonald inaugurated the plant, which boosts the total yearly output of the Gaspereaux and Black River power development to 100,000,000 kWh, enough to supply one-third the power demands of the city and county of Halifax and the towns and rural communities of the Annapolis Valley.

Seven Sisters Completed

The sixth and final 37,500 h.p. set at the Winnipeg Electric Co.'s Seven Sisters station was put into commission a few days ago, thus completing the 225,000 h.p. development. This is now the largest hydro-electric plant between the Great Lakes and the Rockies, according to Mr. W. H. Carter, president and general manager of the company. Completion of the final unit marks the end of an expansion programme launched by the company in 1947. Since that time many tons of rock have been excavated and, together with raising of the dykes above the plant. the head has been increased by 26 ft to 66 ft.

France's Production Shares

Authority has been granted by the French Government to Electricité de France to float a new loan as from October 21. This one, however, is to be different from the others in that subscribers become holders of "production shares" instead of debentures.

The shares, priced at 16,000 francs, entitle the holder to receive each year a sum corresponding to the average selling price of 100 kWh with, however, a guaranteed minimum of 720 francs.

The contract is for a period of 15 years. It can, however, be redeemed at any time after July 15, 1958, either at the option of the holder or by the drawing of lots. In the latter case, redemption will be effected by payment of a sum equal to about twenty times the value of the right (i.e. 20 times the value of 100 kWh) due in the year of drawing, with a minimum of 16,000 francs. In the case of redemption at holder's option payment will be made at the original price.

Start on Auckland Electrification

An announcement from Wellington states that the New Zealand Government has decided to make an immediate start with the preliminary phases of the electrification of Auckland's suburban railway system, as part of the £20,000,000 scheme of development extending from Auckland to Frankton Junction.

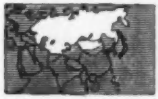
Mr. Goosman, Minister of Railways, said that initial designs and drawings of two essential bridges had already been made and construction should be under way by the end of 1953. A definite scheme of progressive development had already been decided upon, and construction work under this programme would be spread over a number of years as resources of material, labour and finance became available.

The full scheme will also provide for the construction of underground stations. To expedite work and overcome a shortage of engineering staff it is proposed to engage an overseas civil engineering consultant to advise the Government.

A leading firm of electrification experts would also be appointed to advise in detail on the design and construction of the electrification system, having regard to capital cost and operating efficiency.

The responsibility of the electrification consultant would be to submit plans and specifications, with costs, for the electrical system to be adopted, including traction equipment, signals, communications and rolling stock.

Soviet Power Progress



Reporting to the delegates at the nineteenth session of the All Union Communist Party which was recently held in Moscow, Mr. D. G. Zhimerin, Minister of Electric Stations, said that power plants in the Novosibirsk Area of Siberia were being substantially expanded under the programme of electrifying the Siberian Railways.

Work had begun on the building of an Angara River hydro-electric station of which the speaker said the ultimate capacity would be 60,000 million kWh per year.

The chairman of the State Planning Commission, Mr. Saburov, speaking at the same congress, forecast an 80% increase in electric power production. In references to the hydro-electric projects at present under construction (Kuibyshev and Stalingrad on the Volga and Kakhovka on the Dnieper) he said that Kuibyshev would have, eventually, a generating capacity of 2,100 MW.

D

PERSONALITIES IN THE INDUSTRY

Metropolitan-Vickers Electrical Co., Ltd., announce that **Mr. R. Allen** is appointed manager, Birmingham District Office, as from October 1, 1952, in succession to **Mr. A. F. Bock**, who has retired.

Mr. R. Allen, ASSOC.M.C.T., A.M.I.E.E., came from Manchester Grammar School to the then British Westinghouse Company as a trade apprentice in 1916 and won a company's scholarship to the Manchester College of Technology. In 1921 he joined Motor Engineering Department, and in 1926 transferred to General Engineering Department, where he dealt with industrial electrification schemes. In 1947 Mr. Allen moved to the M.-V. Birmingham Office as senior plant sales engineer, handling switchgear transformers, rolling mill equipment, colliery equipment, etc.; he was appointed assistant manager in May of this year. Mr. Allen is treasurer of the Warwick and South Staffordshire Branch of the Association of Mining Electrical and Mechanical Engineers. He is a member of the Electrical Power Engineers' Association and also of the Birmingham Electric Club.

Mr. F. Bock had been with the company for 45 years, for 26 of which he was manager of the Birmingham District Office. He came to the Trafford Park Works in the early days of British Westinghouse, and after serving a college apprenticeship from 1907 to 1910, he joined the Plant Department. On release from the forces after World War I, Mr. Bock returned to Plant Department, and towards the end of 1921 he sailed for South America; he was stationed at Valparaiso and represented the company in Chile and Peru during the next four years. On his return to this country, he was attached to the company's London Office, but in March 1926 he was appointed manager of the Birmingham Office, a position he continued to hold until his retirement. Mr. Bock is a member of the Birmingham Electric Club, and the Birmingham and District Scottish Society, and also a member of the Committee of the Midland Electrical Engineers' Association.

Mr. R. Allen

Mr. A. F. Bock

Mr. C. W. Kelsey (Chief Purchasing Officer, The London Electric Wire Company and Smiths, Ltd.) was elected President of the Purchasing Officers Association at its 21st Anniversary Conference, recently held in Harrogate. One of the two founder members of the Association who have served continuously on its Council from its formation in 1931, Mr. Kelsey has the distinction of being the first member of the P.O.A. to hold this office for a second time. He was President in 1938-9.

Mr. C. W. Kelsey

He originally joined The London Electric Wire Company and Smiths, Ltd., in 1928 as Purchasing Officer at the firm's Leyton works. Previous to that he was assistant buyer with the British Electric Transformer Co., Ltd., from 1920 till 1928.

Re-elected as vice-presidents were **Mr. P. C. Corrance** (Blackburn (Dumbarton), Ltd.); **Mr. A. Elliott** (Churchill Machine Tool Co., Ltd.); **Mr. J. C. Thompson** (Edgar Allen and Co., Ltd.); **Mr. C. H. Tomlinson** (Boots Pure Drug Co., Ltd.); and **Mr. D. Wragg** (Thos. Firth & John Brown, Ltd.).

Mr. H. W. King (Eburite Corrugated Containers, Ltd.), previously chairman, was elected as a vice-president, the new chairman being **Mr. F. J. White** (Chance Bros., Ltd.), with **Mr. H. H. C. Wood** (Igranic Electric Co., Ltd.) as vice-chairman.

Major C. Greenhalgh, ASSOC.I.E.E., managing director of C. Greenhalgh (Electrical), Ltd., wholesale electrical suppliers, of Burnley, who for the past five years has commanded 50 A.A. Wksp. Coy., R.E.M.E. (T.A.), with headquarters at Accrington, Lancs, has been appointed to the command of 15 A.A. Wksp. Bn., R.E.M.E. (T.A.), with headquarters at Clifton, Manchester. The appointment carries with it the rank of lieutenant-colonel.

Major C. Greenhalgh

The National Coal Board have announced the appointment of **Mr. J. V. Curry** to be Labour Director of the N.E. Division, in succession to **Mr. Tom Smith** who has retired. Mr. Curry was Labour Director for the N.E. Region of the Ministry of Fuel and Power.

Sir Charles Colston, C.B.E., M.C., D.C.M., the chairman and managing director of Hoover, Ltd., and Lady Colston left England for Johannesburg by B.O.A.C. Comet airliner on October 19, and will return to London this week. The purpose, of this visit is to enable Sir Charles to bring himself up to date with Hoover operations in the Union.

A member of the Dollar Exports Council, Sir Charles has made exports a priority call on the capacity of his company's factories in England, Scotland and Wales. He has himself visited on his company's business many of the 88 countries to which British-made Hoover products go.

The following appointments in their Sales Service Organisation have been announced by Hoover, Ltd. **Mr. G. Wall** is to be branch manager of the North East Branch, with headquarters at Leeds. **Mr. E. Johnson** is to become district manager at Hendon. At Ealing **Mr. R. G. Evans** will take over the duties of district manager, and **Mr. H. A. Assinen** will fill the position of district manager at Brighton.

It is announced by Ekco-Ensign, Ltd., that **Mr. G. H. Bury** has now been appointed representative for certain areas of Hampshire, Dorset and South Wiltshire.

Mr. G. H. Bury

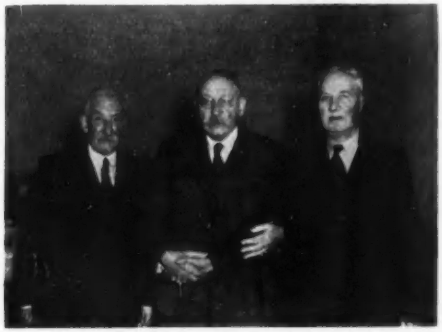
Mr. T. C. Struthers, B.Sc., has recently been appointed Hull District Engineer to the No. 6 Sub-Area of the Yorkshire Electricity Board, to succeed Mr. G. W. Mitchell, A.M.I.E.E., the new Sub-Area Engineer.

Mr. Leon Bagrit, managing director of Elliott Bros. (London), Ltd., has been appointed to the board of Southern Areas Electric Corporation. He is also a director of B. and P. Swift, Swift and Swallow, and Mutual Finance.

Members of the Publicity Committee of the Electric Lamp Manufacturers' Association recently gave a farewell dinner to **Mr. H. E. Goody** at the Trocadero, London.

Mr. Goody, who was a permanent member of the Committee, retired from the position of Lamp and Lighting Advertising Manager with B.T.H. in July. Also present at the dinner were E. B. Sawyer, Lighting Service Bureau; W. J. Jones, E.L.M.A.; F. J. Addington-Hall, Phillips; McK. E. Tatchell, Ediswan; H. R. Mallett, Siemens; and Miss N. E. Miller, Ediswan.

From left to right, Mr. O. W. J. Farmer, Mrs. Goody, Mr. Goody and Mr. R. E. Hesketh



Three of the old E.C.C. stagers, Mr. W. M. Furniss, Mr. Tom Parkins and Mr. James Lee

As a "Golden Jubilee" cocktail party held in the staff canteen of Bushbury Engineering Works, on Wednesday, October 15, the guest of honour was **Mr. William Marter Furniss,** chairman and managing director of the company, to mark his 50th year with the Electric Construction Company.

Mr. Furniss joined the company in 1902 as sales engineer, becoming general manager in 1915, director and manager in 1926, and managing director in 1942, combining this latter office with the chairmanship of the company in 1948.

Mr. J. N. Baker has succeeded **Mr. S. C. Irving** as Deputy Station Superintendent at Poole Generating Station. Mr. Baker, who was previously Maintenance Superintendent at Poole, joined the Electricity Supply Industry in 1936 when he was appointed Charge Engineer at Fulham Generating Station, where he later worked as Assistant Maintenance Engineer from 1940 to 1946. He went to Blackburn Meadows Generating Station at Sheffield as Repair and Maintenance Engineer in 1946, being appointed Mechanical Maintenance Engineer at Brighton Generating Station in the following year. On December 1, 1950, Mr. Baker commenced duties as Maintenance Superintendent at Poole.

Mr. P. A. D. Duffell, Assistant Export Manager, South American Division, Hoover, Ltd., left this country on October 17, via New York, for a 15,000-mile air tour to South America and back, during which he will contact the company's agents and distributors in British and Dutch Guiana, Venezuela, Colombia, Ecuador, Peru and Brazil. He was accompanied by **Miss R. M. Mercer,** one of the Hoover, Ltd., washing machine advisers.

Twelfth President of the British Institution of Radio Engineers is **Mr. W. E. Miller.** Leaving Cambridge University in 1924, Mr. Miller joined the Cambridge Instrument Co. before being appointed to the editorial staff of *The Wireless and Electrical Trader*, of which he was Technical Editor for 14 years and is now Editor. He is the author of several books dealing with radio, and he has been associated with the Brit. I.R.E. for some 20 years. He was elected Vice-President in 1948.

Mr. W. E. Miller

In our last issue we mentioned that **Mr. S. J. Clarke** would be leaving the Swansea office of the British Thomson Houston Co. We now learn that he is to take up the appointment as district manager at Newcastle-upon-Tyne. Mr. Clarke was appointed resident engineer at Swansea in January 1933, and after serving with R.E.M.E. in the last war and attaining the rank of Lieut.-Colonel, returned to Swansea where in 1948 he became district manager. **Mr. K. M. Fox** will take the place of Mr. Clarke at Swansea.

After serving the Scottish Centre of the I.E.E. for 25 years, first in the post of asst. hon. secretary and latterly as joint hon. secretary, **Mr. H. V. Henniker** retired from this position on September 30. In view of his services, the Centre Committee feel that members would like to show their appreciation, and subscriptions—not exceeding 5s. each—are being sought for a suitable present.

In our last issue, in recording the additions and changes of personnel in Micanite and Insulators Co., Ltd., we reported **Mr. J. K. Clark,** B.Eng., A.M.I.Mech.E., A.M.I.E.E., A.M.I.EX., as being appointed "export sales manager." His actual appointment is, however, "export sales engineer."

Wills.—**Mr. Kenneth Alexander Scott Moncrieff,** M.I.E.E., of The Clough, Oxted, Surrey, former chairman of Cawnpore Electric Supply Corporation and Madras Electric Supply Corporation, and of Hendon Electric Supply Co., and other companies, a past director of North Met. Electric Power Co., and who was largely responsible for the introduction of electricity into Calcutta, died on August 5 last, aged 83 years, leaving £31,025 3s. 5d. gross, £30,795 8s. 10d. net value. (Duty paid £5,124.)

Mr. John Henry Thomas, M.C., M.I.E.E., of 10 The Cliff, Roedean, Brighton, formerly of Fristons, Sutton Road, Seaford, Sussex, late managing director of A. C. Cossor, Ltd., and chairman of the Radio Manufacturers' Association for a time, who died on July 4 last, left £14,268 8s. 11d., gross £11,634 14s. 8d. net value. (Duty paid £376.)

NEW LITERATURE

Worked Examples in Illuminating Engineering

by R. W. Ames and J. B. Harris

As illuminating engineering is becoming more strongly established in the syllabus of most modern technical colleges, it has been felt by the authors that the student should be given some guide to the form answers to examination questions in this subject should take. To facilitate its use, the book is divided into two parts to correspond to intermediate and final examinations of the City of Guilds of London Institute, but students of other engineering courses should find in it much valuable material.

Approximately the same field is covered in the two parts of the book but as may be expected the second half attains the higher standard commensurate with the final examination. From the elements of light—its nature, production and control—attention is directed to the eye, which is considered both physiologically and optically. Photometry forms the basis for further study and from measurement of light the next consideration is its application. Under this generic term, light sources, fittings and materials are first discussed before proceeding to apply them to the practice of illumination. Published by MacDonald, 238 pages, size 8½ in. by 5½ in. Price 21s.

Electricity Meters & Instrument Transformers

by S. James, M.I.E.E.

For its clear statement of principles and its wide range of illustrative examples, this addition to the literature of measurement is going to be of the greatest value to students and to engineers in the supply industry. Mr. James has steered a most happy course between flaccid generalities and an over-mathematical attack on the more obscure errors that affect energy measurement.

Throughout the volume there is a close attention to the conditions in which meters are used, and it is appropriate that the opening chapter is concerned with specifications and legal requirements. The author then deals with d.c. meters, before passing to what must be the main concern of any book on this subject—the single-phase energy meter. A chapter on constructional details comes first, introduced with a short note on the theory of operation, and concluding with notes on the salient points of some modern designs.

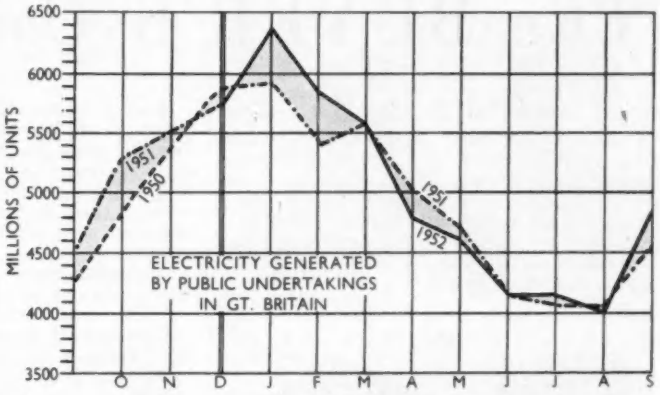
Later sections of the book deal, on a similar pattern, with polyphase motors, kVA meters and maximum demand indication. The final chapters deal informatively with summation metering and instrument transformers. Published by Chapman and Hall, 467 pages, 8½ in. by 5½ in. Price 50s.

UNITS GENERATED

4,821 million units was the total generated during September in stations under the control of the B.E.A., the North of Scotland H.E. Board, and the Lochaber Power Co. The corresponding figure last year was 4,462 million units, so there has been an increase of 8·1% over the twelve months.

Of the total, 4,718 million units were generated in steam stations and 91 million units in hydro-electric.

Energy sent out during the month was 4,536 million units, 94·0% of that generated. This gives the total for the year so far as 41,721 million units, showing an increase of 1·8% on the first nine months of last year.

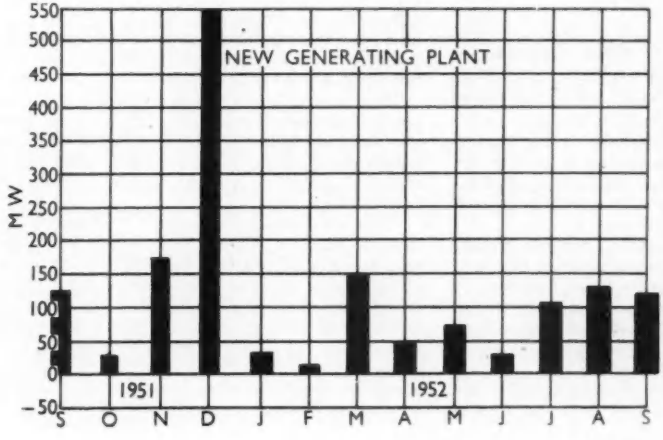


POWER SUPPLY IN SEPTEMBER

NEW plant was commissioned in 12 British Electricity Authority stations during September, and although only three sets are included in the list, there are ten boilers to record. A start may be made with the one new station, Bankside (London). Here the first 375 klb/hr Foster-Wheeler oil-fired boiler was brought into use. Present plans provide for four such boilers and two 60 MW sets at this 900 lb/sq in., 900° F station. Also in the London list comes Battersea B, with a 425 klb/hr Babcock and Wilcox boiler. The one Southern division station to appear this month is Poole, where a fifth 300 klb/hr International Combustion unit began to steam, while another singleton comes from the S.W. division in Plymouth B, where a 31·5 MW M.V. set was brought into commission.

Cliff Quay, in the Eastern division, has only one boiler outstanding with the commissioning of the sixth 45 MW M.V. set in September. The 230 klb/hr I.C. boiler brought into use at Nechells B (Midlands division) leaves two sets and six boilers still to come. At Braehead (S.W. Scot.) a fifth 300 klb/hr B.&W. boiler steamed.

There are two Merseyside and N.W. stations which have added to their steaming capacity—Bromborough, where the boiler is a 300 klb/hr B. and W. unit, and Clarence Dock, where a 350 klb/hr unit by the same manufacturers has been installed. Finally come three North Western stations—Blackburn (150 klb/hr Simon Carves boiler), Huncoat (305 klb/hr Simon Carves boiler) and Westwood, where a third 30 MW B.T.H. set and a fourth 300 klb/hr B. & W. boiler were commissioned.



GENERATING PLANT

At the end of September, 1952, the installed capacity of the B.E.A. was 16,356 MW, showing an increase of 121 MW during the month. During this same period the North of Scotland total remained constant at 643 MW. The month's commissioning figures bring the overall increase during the past twelve months to 1,419 MW, or 9·1% of the total at the end of September, 1951.

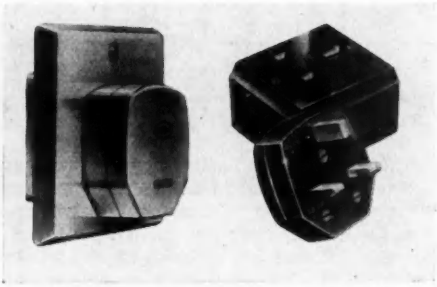
The total installed capacity used for the purposes of this graph should be distinguished from the output capacity. The installed capacity is the total m.c.r. of all the generating sets which are connected on both steam (if appropriate) and electric sides and are suitable for service.

The BUYER'S *Column*

Now—M.E.M. Plugs and Sockets!

LATEST addition to the range of switchgear products made by MIDLAND ELECTRIC MANUFACTURING CO., LTD., Reddings Lane, Birmingham 11, are new 13 amp three pin fused plugs and shuttered socket outlets to B.S. 1363.

Backed by the good name of M.E.M. these accessories are well designed and everything made on the M.E.M. premises.



MEM's new accessories are well designed

The sockets have an extra safe shutter design preventing access to the "live" sockets until the earth pin is inserted. The socket base is of non-tracking vitreous porcelain made by the firm themselves.

The plugs can be fused for 13 amp, 7 amp or 3 amp, according to the appliance in use. Fuse links are interchangeable and there is provision within the cover for a spare plug. One piece pins and terminals are removable.

Made in surface or flush patterns in brown or ivory white plastic materials the plugs and sockets are characterised by their design.

Price Reductions

FOLLOWING the report of the Committee on National Policy for the use of Fuel and Power Resources, headed by Viscount Ridley, C.B.E., published last month, which makes strong recommendation that the saving of fuel by the use of fluorescent lighting should be encouraged in every way, numerous firms have announced reductions in the prices of their equipment.

GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2, is reducing its prices of many fluorescent lighting fittings as from October 15. The prices of some of the more popular fittings are being lowered as much as 20 per cent. At the same time the company is reducing prices of fluorescent tube auxiliary gear by 5%.

Reductions in the prices of some tungsten fittings are also announced.

Reductions are also announced in the selling prices of all fluorescent lighting fittings in the Mazda range, by BRITISH THOMSON-HOUSTON, LTD., Crown House, Aldwych, W.C.2.

The fittings mainly affected are the bare-lamp, reflector and louvered types most frequently employed in commercial and industrial lighting schemes.

The reductions are inclusive of lamp auxiliary gear prices and purchase tax.

These changes have been made possible in part by the recently announced reductions in Mazda lamp auxiliary gear prices.

Also in support of the Ridley Committee's recommendation the EDISON SWAN ELECTRIC CO., LTD., 155 Charing Cross Road, W.C.2, are reducing the prices of their more popular industrial lighting fittings, including electrical auxiliary gear, for use with all sizes of tubular fluorescent electric discharge lamps.

These price reductions come into force on October 15; full details of the items affected with their old and new prices are given in a list now available from the firm.

THORN ELECTRICAL INDUSTRIES LTD., 105 Judd St., N.W.1 announce price revisions on a number of Atlas fluorescent fittings and items of control gear with effect from Oct. 23, 1952.

As from October 1, 1952, the prices of the most popular Stella-flash flashbulbs have been reduced, it is announced by STELLA LAMP CO., LTD., 37-39 Oxford Street, London W.1.

The prices of the full range of Stella flashbulbs now are: SF.14, 1s.; SF.25, 1s. 2d.; SF.60, 1s. 8d.; S.F.100, 2s. 6d.; SF.24, 1s. 5d.; SF.45, 1s. 10d.; SF.S., 1s. 3d.

Sign Service by Chase

ALTHOUGH CHASE PRODUCTS (ENGINEERING) LTD., 27, Packington Road, London, W.3, have been in existence for only six years they have extended their business so rapidly they are now finding it necessary to take an additional factory.

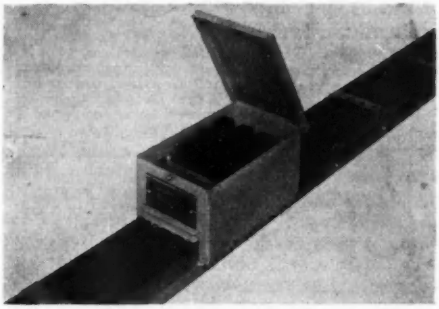
They have a country-wide organisation for fixing, and are actual manufacturers of, neon tubes and also are concerned with cold cathode lighting installations, which of course, can be provided in standard fittings or specially made to suit particular jobs.

Their main product of interest to builders, sign makers, etc., are built-up metal letters which can be seen on practically every fascia and shopfront. These can be manufactured either entirely out of lead-coated sheet steel, finished stove enamelled in one, two or more colours, or with stainless-steel faces. They can also be adapted for receiving neon tubes. The firm also makes cast bronze letters, either flat faced or ceramic enamel filled, and all general sign work.

Barduct is lighter and smaller

AN interesting system for the distribution of electricity in workshops and factories is marketed by MARRYAT AND PLACE LTD., 40 Hatton Garden, London, E.C.1.

This is the "Barduct" system which has been developed for distributing power to motorised machine production lines having total load capacities of 250 amp and less, on a.c. or d.c. supplies. It provides at a very low cost all the advantages of the metal-clad bar distribution system intended for heavier loads and can be coupled directly to other metal-clad feeders of the horizontal or rising main types made by the company.



Additional boxes are easily coupled to Barduct

An example of the coverage of the system is the fact that two tapping-off points exist in every yard run of the bus-bars.

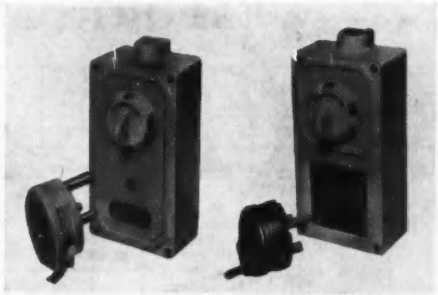
Standard Barduct is less than 1½ in. deep and 5½ in. wide for both the 150 A and 250 A four poles units. Each conductor is separately enclosed throughout its length in specially designed insulating tubes supported in a rigid steel framework. The rust-proofed steel angles are bonded at positions of joints to afford efficient earthing of all accessories and connected sub-circuits. Barduct lengths are easily joined by bolting together, whilst additional tapping boxes are easily fitted by removing a retaining strip slightly, back covers, and fitting the box in place.

A Simmerstat Socket-outlet

THE advantages of close control with Sunvic Controls "Simmerstat" must be well known to all our readers, and there must be many who have wished for similar facilities for fires and other heaters, hot plates non-thermo-controlled irons and many other appliances in the home, hospitals, restaurants and in industry generally.

These dreams can now be realised, for J. H. TUCKER & CO., LTD., Kings Road, Tyseley, Birmingham 11, have marketed two ranges of sockets—15 amp round pin and 13 amp flat pin—combining a Sunvic "Simmerstat."

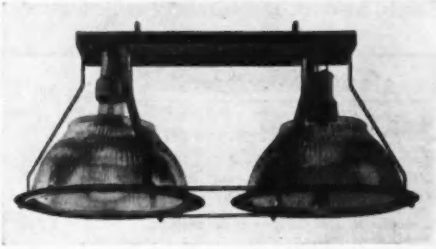
Both surface and flush models are available in each range. The former can be supplied either in a cast-iron case, finished in cream enamel or in a black enamelled cast-iron box with aluminium alloy plate finished B.M.A. The flush type has an overlapping plate, made either of aluminium alloy finished B.M.A. or moulded in bakelite.



The Tucker Simmerstat Socket-outlet is for 13 and 15 amp installation

Holophane Blended Lighting

A RANGE of twin blended lighting units employing both mercury discharge and filament lamps has been designed by HOLOPHANE, LTD., Elverton Street, S.W.1, for industrial installations where high standards of illumination, good colour quality and economy in operation are particularly desirable.



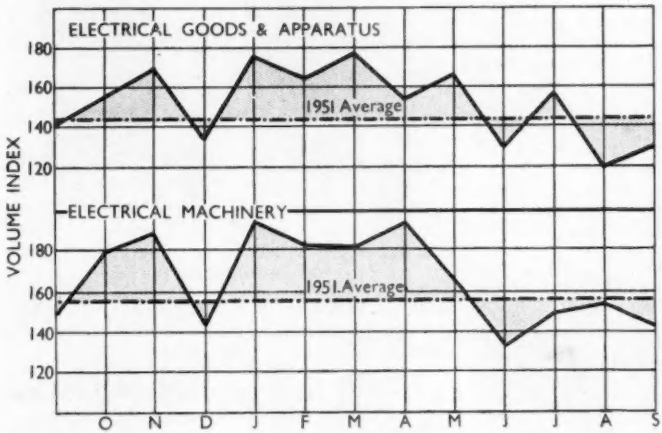
Holophane have now designed a blended light unit

In these Holophane twin lighting units, the individual light distributions of the mercury and filament reflectors are carefully matched, this factor being important in obtaining good colour uniformity in the blended light.

Flameproof Cable Glands

TWO new glands suitable for pliable wire-armoured cable extend the range of flameproof accessories made by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2. They have been certified for use with Group 1 gases by the Ministry of Fuel and Power testing station at Buxton, the certificate number being FLP. 825/2 when attached to G.E.C. (S 510) flameproof switches, and FLP. 1030/1 when attached to G.E.C. (S 512) flameproof switch fuses. Price for 1 in. E.T., suitable for two-core 70/-0076 PWA t.r.s. cable (Cat. No. S 539) and 1 in. E.T. suitable four four-core cable (Cat. No. S 540) is £3.

EXPORTS AND IMPORTS



EXPORTS VOLUME INDEX

The fall in the export of electrical goods and apparatus during August has been counterbalanced to some extent by a rise during September, although the E.T. Index shows an increase of only 10 and 129% above the 1947 average. In terms of cash goods exported amounted to £8,263,255.

The general picture is not brightened by the index of electrical machinery exports, which has fallen to 143, based on 1947 as 100. This fall of approximately 10% is, as in the two previous months, below last year's average. Electrical machinery exported amounted in value to £4,413,933.

FOLLOWING on the serious drop in value of electrical goods exported during the month of August this year, a slight improvement is noted for the month of September. Whilst this compares favourably with the corresponding month last year and, of course, with August, there is, however, an increase of some £150,000 in the value of electrical goods imported as compared with August.

Notable increase in value of goods exported is in the categories of cables, instruments and X-ray apparatus, but there was a steep decline in the value of goods exported and listed under the title of accumulators, parts and accessories.

Description	Exports Value Month of September			Imports Value Month of September		
	1950 £	1951 £	1952 £	1950 £	1951 £	1952 £
Telegraph and Telephone Wires and Cables						
Submarine	44,583	—	33,045	—	—	—
Other	462,944	336,842	769,203	—	—	—
Rubber Insulated	354,677	556,557	466,912	—	—	—
Insulated, other than Rubber	685,984	885,075	1,300,784	—	—	—
Wireless Apparatus, including Valves ...	1,732,470	1,853,471	2,020,509	243,277	284,731	304,964
Telephone and Telegraph Apparatus... ...	1,229,098	1,324,295	1,134,538	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament Lamp Bulbs	99,389	150,969	74,093	21,079	11,392	8,224
Other Descriptions	262,496	397,652	391,446	25,103	57,346	53,325
Batteries (primary)	140,396	241,240	183,343	—	—	—
Accumulators, Portable	241,266	464,469	178,151	—	—	—
,, Stationary	61,847	70,421	33,570	—	—	—
,, Parts and Accessories ...	55,753	93,639	48,083	—	—	—
Electrical Cooking and Heating Appliances...	244,958	449,523	267,337	—	—	—
Ammeters, Voltmeters, etc., and Parts ...	90,776	98,558	104,056			
House Service Meters	102,569	134,843	90,624	40,672	43,558	54,802
All Other Instruments	121,865	116,105	143,889			
Electro Medical Apparatus	44,003	46,693	39,178	—	—	—
X-Ray Apparatus, etc.	84,201	172,270	124,676	15,844	20,419	47,735
Insulating Materials	125,976	202,080	115,404	—	—	—
All Other Articles	465,355	514,829	744,414	79,300	168,655	209,422
Total of Group	6,660,606	8,064,531	8,263,255	425,275	586,101	678,472
Generating Sets (Diesel)* Not exceeding 200 kW	323,907	334,182	322,092			
,, ,, ,, Exceeding 200 kW...	130,401	81,849	136,835	19,301	14,538	37,593
Other Generating Sets	331,370	423,790	71,127			
Generators minus Prime Movers, and Parts†	115,077	429,992	868,990			
Motors	613,680	779,106	738,470	29,142	35,595	53,553
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	1,498,939	1,942,097	2,240,869	11,264	34,657	18,334
Fans, Electrically and Power Driven	139,244	159,080	182,052	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	298,204	696,902	230,944	—	—	—
Total Appliances and Machinery ...	10,111,428	12,911,529	13,054,634	484,982	670,891	787,952

* 1950 Figures include generators minus prime movers. † 1950 Figures for parts of generators only.

The WEEK in NEWS

Tariff Increases in Midlands and S.W.?

Two more Board Chairmen predict Rising Prices

AMONG official comments on the annual reports of the Electricity Boards were those made recently by the chairman of the Midlands and South Western Boards. In the course of his remarks, Ald. W. Lewis (Midlands) forecast a possible increase in electricity charges in the Area in the near future. He hastened to add, however, that the increases would be small. There were, he said, numerous alternatives at their disposal and the Board would have to make up its mind which to adopt.

Ald. Lewis said that when making any necessary adjustments, the Board would be working on very small percentages. To verify this he added that a 5% rise in charges to all consumers would bring in an additional income of over £1 million. He reminded those present that among other rises in prices, the cost of coal had gone up 10s. a ton in the past two years.

The South Western Board's chairman, Mr. S. F. Steward, has also warned consumers of possible tariff increases. Prices were, however, unlikely to go up this winter—the spring was a more likely time. Compared with the changes under the standardisation of tariffs, he said, any alterations would be of a comparatively minor order. The chairman assured his audience that the Board would not rush to increase prices. Mr. Steward said it had been some achievement to keep their electricity below 1d. per unit (at present it is ¾d. a unit), but costs were mounting steadily, and the facts would have to be faced. Due to rising prices and wage awards, the Board faced an increased expenditure of over £528,000 this year.

These forecasts follow closely that given by Mr. C. R. King, chairman of the E. Midlands Board who stated that the position in that Area would be known during November.

Should N. of Scotland Board Incur a Deficit?

AT a meeting with officials of the North of Scotland H.E. Board at Bonar Bridge last week, Clr. J. Calder said that in view of the fact that the Board hoped to be making large profits from such as the £8 million Loch Schin scheme in the next ten or twenty years, they ought to be allowed to incur a deficit now. If this were possible, he suggested that the guarantee sought by the Board might be reduced.

The Board's manager at Dingwall, Mr. R. B. Anderson, at the same meeting, stated that the cost of taking power to the rural consumer was five or six times the cost in the towns. He added that the Board was prepared to meet that cost if they got a 100% consumer response in any district.

PAKISTAN'S LOCO ORDERS GO TO U.S.

BRITAIN'S pre-war monopoly in orders for locomotives and rolling-stock from Pakistan has fallen to almost unrecognisable proportions. Orders for 19 electric locomotives, valued at over $4 million have just been placed with two American firms. The American Locomotive Co. is to deliver nine engines to Pakistan by next April, and the General Electric Co. (U.S.), ten by July. Last year Pakistan bought 23 locos from Japan and France. The alleged cause of this country's failure in this market is her difficulty regarding delivery dates.

Aluminium Price Raised

AS from Monday the price of virgin aluminium in ingot form has been increased from £157 to £166 per long ton delivered to consumers' works, for metal of a purity of 99% to 99·5%. The price is expected to remain at this level at least until next April. There is to be no change in the premiums which came into effect on July 1 for metal of higher purity and for metal in novel bar form.

The First Half-Century

Last week I ventured to suggest that a gas turbine would be the most efficient of all engines for electricity works, but was also rash enough to state that the inventor has yet to be evolved. I was set right on this latter point by a call from the inventor himself, Mr. Chas. Deutschmann, who assured me that not only was he more than a week old but that he has been working at his invention for some years back, and offered to show me shortly the working drawings thereof. Of course, I can express no opinion on the motor until I have seen it, but I wish my visitor every success. Mr. Deutschmann has, of course, every confidence in the ultimate success of his invention, and seems to have arrived at an unduly high estimate of my prophetic powers.—*From our issue of October* 23, 1902.

LOAD SPREADING UNNECESSARY IN 1955?

Prediction made at E.L.M.A. Conference

A FORECAST that this country would be completely free from load spreading and load shedding within the next two or three years was made at a conference of the Electric Lamp Manufacturers' Association which took place at Stoke recently. The predictor was Mr. H. A. P. Caddell, manager of the Staffordshire sub-area of the Midlands Electricity Board. He said that unless the weather was particularly severe this winter, he thought there was little likelihood that electricity supplies would be actually cut off. Mr. Caddell admitted, however, that uncertainties as regards the weather made accurate forecasting difficult.

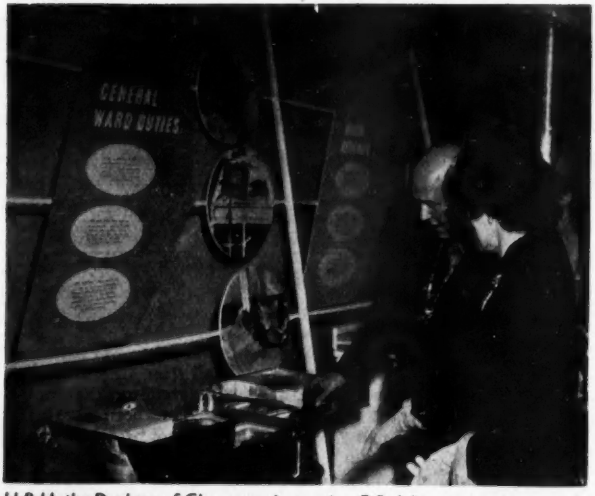
Giving a reason for his forecast, Mr. Caddell said the electricity supply position had improved considerably and there was every reason to presume that the improvement would be maintained. In his particular district, he added, there had only been one cut during the past 12 months.

During the course of the conference two papers were read. Mr. F. Jamieson, of E.L.M.A., spoke on "Pottery Lighting," in which he pointed out the necessity of good lighting schemes in industry to ensure increased production. The other paper was on "Materials Handling," and was given by Mr. L. Landon Goodman of E.D.A.

Plymouth's Industrial Charges Criticised

CRITICISM of the increased electricity tariffs for industrial consumers was made at last week's meeting of the Plymouth Chamber of Commerce. It was stated that a firm which had been paying 1·2d a unit had to pay 3·5d a unit now. It was pointed out that the reason for the increase, as explained by the Board, was that industrial charges in the locality were lower than elsewhere and had been raised to bring them into line.

A resolution was passed inviting local industrial firms to to state what their charges for electricity were. The replies would then be co-ordinated and sent to the Area's Consultative Council.



H.R.H. the Duchess of Gloucester inspecting E.D.A.'s stand at last week's Nursing Exhibition. The 37th annual London Nursing Exhibition and Conference took place at the Seymour Hall. With H.R.H. in the picture is Sir Cecil Wakeley, President of the Royal College of Surgeons

OFFICIAL PUBLICATIONS

BRITISH STANDARDS.
B.S. 1164: 1952. *Dimensions of re-focus lamp-caps and lampholders for voltages not exceeding 250 V. (Revision.)* B.S. 52: 1952. *Bayonet lamp caps, lampholders and lampholder plugs.* B.S. 731: Part 1: 1952. *Flexible steel conduit and adaptors.* B.S. 2G131: 1952. *Lead acid batteries (non-aerobatic) for aircraft.*

IRON AND STEEL PRICES (No. 3) ORDER, 1952. H.M.S.O. 2d.

Commons Questions on Highland Flooding

RECONSTRUCTION work following the flood damage to the North of Scotland H.E. Board's scheme at Quoich and Invergarry last month, is now well under way, we understand from reports reaching us from Scotland. Small dams at Loch Quoich and at Invergarry were swept away and the damage may well amount to several thousands of pounds. The Board, however, is unlikely to have to pay anything as the contracts provide that such contingencies are the contractors' responsibility.

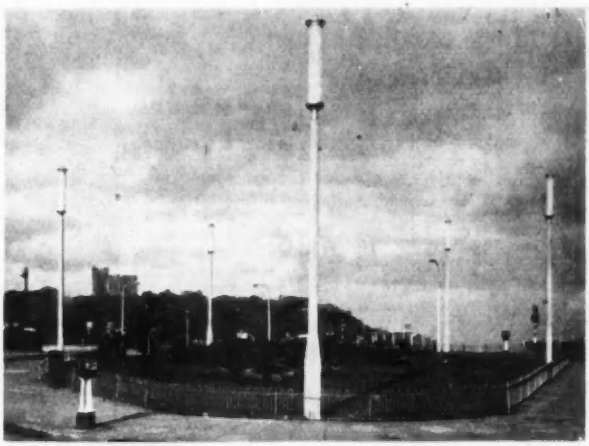
A stronger dam is now being built, with a concrete weir and sluice gates, which, in the event of further flooding, will be opened. Previously when flooding threatened, the top courses at the west end of the coffer dam were to be removed. This was done in September, but the force of the water broke the barrier. The damage is the subject of questions tabled in the House of Commons recently.

Welding for the B.E.A.

A LARGE portable automatic arc welding machine suitable for welding prefabricated H-type and box-section girders up to 100ft in length has been designed and made by Fusarc Ltd. The first machine built specially for Alexander Findlay and Co. Ltd., has been installed at that company's Motherwell works and is being used to manufacture girders for several new B.E. power stations.

DUDLEY HAS NEW STREET LIGHTING

A LARGE street lighting installation comprising some 250 units has just been completed at Dudley. All the equipment was supplied and erected by Revo Electric Co. Ltd., and included in the apparatus provided were 212 "Silverblue" mercury lanterns and 38 vertical fluorescent lanterns. The new fluorescent lighting installed in the Market Place and High Street is notable for the fact that they form one of the first installations in the country in which cylindrical lanterns of this kind have been mounted on artificial stone columns. The installation has been planned both to provide adequate safety for road users, and to give effective illumination for adjacent buildings. Wherever possible the daylight effect has been attained.



Vertical fluorescent and "Silverblue" lanterns round an island site at Dudley where a new street lighting scheme was switched on on October 9

World Exchange of Students for Training in 1952

THE fifth annual report of the International Association for the Exchange of Students for Technical Experience gives encouraging news of an increase of students gaining practical experience in industry abroad. As far as Gt. Britain is concerned, 488 students were sent overseas for additional experience and a total of 602 received for training in British industry and commerce. These totals compare respectively with 422 and 457 during the preceding year. Of the total of 488, the largest number of British students (111) went to Sweden and 83 to France. Those same countries sent the most students to this country, 158 coming from Sweden and 112 from France. Germany sent the highest number of persons (682) abroad, and Sweden received the largest total (820). Seventeen countries are now participating in the exchange, which this year involved some 3,493 young men. Canada is expected to take part next year. Twenty-four British universities and colleges are now co-operating together in this project through the central office at Imperial College.

Ministry takes over Part of Technical College

MAINTENANCE of the engineering and science departments of Loughborough College, well-known for the training of engineers, has been transferred from the Leicestershire local Education Authority to the Ministry of Education. These departments will in future be organised as a separate establishment and maintained principally by grant from the Exchequer. The local authority has found that the increasing burden on the county's ratepayers could no longer be justified, particularly because only about 50 of the 800 students in attendance came from Leicestershire, and consequently appealed to the Minister to relieve them of the financial responsibility. The request was accepted and the local authority has agreed to make an annual grant of £15,000 towards the cost of the College. The new College will be known as the Institute of Technology, Loughborough College.

Smoke Complaints

HALIFAX'S town clerk has replied to complaints about excessive smoke in the town, especially from electricity works. He has pointed out that provided the property owner could show he was doing his best practically to prevent excessive smoke, he is committing no nuisance. As to the introduction of a bye-law, he said the Council could do nothing. Unless thick and black smoke was emitted for over two minutes in every half-hour, bye-laws were not infringed.

GERMANS STUDY U.K. TRAINING METHODS

A GROUP of eight heads and deputy heads of technical and similar colleges in Germany arrived in this country last week on a three-week visit to study our methods of training technicians for industry. In the course of their stay they are visiting technical colleges of all kinds all over the country.

Subjects in which they are particularly interested are mechanical and electrical engineering and telephony. The study tour has been arranged by the Foreign Office and the British Council. Included in the party are Mr. Heinrich Duensing, head of the mechanical and electrical engineering and naval architecture departments at Ingenieurschule, Hamburg, and Mr. Hans Wegermann, deputy head of Ingenieurschule, Kiel, and head of the electro-technology department.

Dame Caroline gives her views on North America

AT the invitation of the London section of E.A.W., Dame Caroline Haslett last week gave a brief account of her experiences during her recent 14,000-mile tour of the U.S. and Canada. Having undertaken the six-week tour as President of the International Federation of Business and Professional Women, her chances of examining any electrical aspects were limited. She did form two particular impressions, however.

The first was that although domestic electrical equipment was more refined and automatic in the States, there appeared to be nothing particularly novel, and that there appeared to be a recession in the domestic electrical sphere in America. The picture in Canada was vastly different. There, she said, was a vast potential in electricity. The Canadians were going ahead with electrical development faster than the Americans and there was a greater zest as regards domestic appliances. As a summary of conditions in the U.S., Dame Caroline said the Americans needed to know more about England; they had a very distorted knowledge and little idea of events in this country.

During the course of her tour, Dame Caroline was honoured by being made an Under-Sheriff of Dallas, Texas, and an honorary citizen of both Dallas and Houston.

Appeal for Funds to Maintain Children

AN appeal to the electrical industry has been made by the president, Mr. C. Gordon Maynard, on behalf of the Royal Commercial Travellers' Schools. Since the schools' foundation 107 years ago, the president stated, 4,885 children have been admitted, there being 265 boys and girls there at present. So far as the electrical trade was concerned, the schools are maintaining 15 such children, which costs some £3,300 a year of the total £50,000 p.a. for all children.

Fifty-two specially designed fluorescent fittings having "Perspex" glazing in the centre panels and surrounds, and housing ten 3 ft 30 W lamps were used in the lighting installation shown here. It shows the National City Bank of New York in Old Broad St., London. Scheme was planned and fittings supplied by the British Thomson-Houston Co., Ltd.

Another Successful Golf Meeting

APPALLING weather which necessitated the postponement of one event until the following day, did not damp the ardour of competitors in the Electrical Industries National Golf Championship for 1952, played at the Worthing Golf Club early last week. This year's meeting, as in the past, proved outstandingly successful and we understand that E.I.B.A. finances have benefited by about £2,500.

The National Championship itself, together with the Sir Montague Hughman trophy was won by Mr. J. Fryer of Wilson and Ford, Nottingham contractors, with a net score of 74. Runner-up, one point behind was Mr. A. G. Gray, who is with G. F. Gray, Northampton contractors. The J. Y. Fletcher cup for the best scratch score (81) was won by L. G. Chittendon of Wall and Attwood, Ltd., and the Veteran's trophy by Mr. F. J. Oliver, of the B.T-H., Southampton, with 76 (net).

Other results included the victory of Mr. W. M. Todd of English Electric, Leeds, and Mr. C. W. Davies of the South Wales Electricity Board, who carried off the Foursomes trophies (68½ net), and of Mr. J. L. Reynolds of Mousants Chemicals, Ltd., Newport, who won the Visitors trophy (71). The best scratch score (78 gross) was returned by Mr. A. Griffiths of the South Wales Electricity Board, and the putting competition over 18 holes was won by Mr. A. E. Hayward of Wessex Wholesale Electric Co. with a score of 36.

During the traditional dinner on the first evening, a cheque for £1,517 2s. 9d. was presented to the E.I.B.A. by the London and Home Counties Area. This sum well exceeded last year's record contribution by any area.

Apprenticeship Scheme for Commonwealth Graduates

A NUMBER of graduate apprenticeships for the study of production engineering are being offered by Hoover, Ltd., to graduates of Commonwealth Universities. The scheme starts with one apprenticeship each to a student from Australia and South Africa, as from the beginning of 1953. The scholarships will cover a return passage to England and are valued at about £1,000 each. Courses will normally extend over one year, but may last longer in agreed cases. The scheme is open to men of over 21, graduates of recognised Commonwealth or British Universities, who have taken mechanical and electrical engineering.

Automatic Control to prevent Train Accidents

FOLLOWING the railway disaster at Harrow and Wealdstone station, and as foreshadowed by Lt.-Col. Wilson at the enquiry, the first main line test with a new prototype automatic train control warning system has been carried out on a regular service. The test was made between New Barnet and Huntingdon by a passenger train on the King's Cross-Newcastle run. Results of the trial will not be made known until further test runs have been made. These will continue until the equipment is proved satisfactory or otherwise.

It is essentially a warning device and acts on the distant signals only. These are the signals which give a warning of the state of the home signals beyond. If the signal concerned is clear a bell rings in the driver's cab, but if at caution, a hooter sounds, the brakes are partially applied and a dial shows a yellow and black sign. Should no action be taken, the application of the brakes is sufficient to stop the train.

The principle on which the control operates is electro-magnetic and depends on the effect of magnets placed between the rails on an armature carried under the forepart of the engine. There is a clearance of 4in. between them and the armature is tilted as it passes over the first magnet. If the signal is at "clear" a second magnet cancels this and brings it back to normal level. If the signal is at "caution" the armature remains tilted.

Who pays for Alterations at Shoreham Harbour?

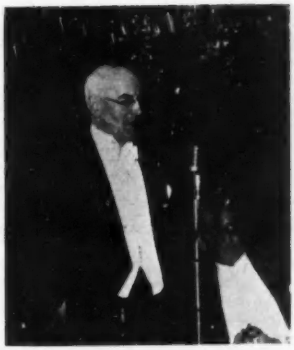
AN appeal by Portslade and Southwick Outfall Sewerage Board against a direction of the Minister of Health apportioning the costs of work in connection with the widening and deepening of Shoreham Harbour, has been dismissed in the Queen's Bench Divisional Court. The Board asked for orders to quash the direction and to give effect to what they contended was the true construction of the Shoreham Harbour Act, 1949. This private Act was passed so that the harbour could be modified and altered to accommodate larger vessels bringing coal to the B.E.A.'s new power station.

The matter arose in respect of the extension of an enlarged sewer, the Board maintaining that the Minister's direction was *ultra vires*. The Board would have to pay £48,000 for what they contended was work which had become necessary solely to meet the requirements of the B.E.A. The court had to determine whether the direction could be made lawfully or whether it contravened the Act.

L.D.C. OPEN DAY

THE second annual open day at the Trafford Park works of Lancashire Dynamo and Crypto Ltd. was held on Saturday last when 1,000 employees, relatives and friends toured the plant. Volunteers, who remained on their normal jobs, explained the technicalities of everyday work.

Since the war, Santon Ltd. have found it necessary to move their London office stores four times, but it appears that they have finally come to rest at Acton. Our illustration shows their acquisition at the East Acton Arcade. Formerly a dance hall it offers spacious accommodation



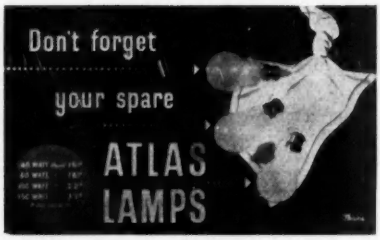
Sir Montague Hughman, chairman, replying to the toast of "The Henley Companies" at the staff dinner and dance held at the Dorchester Hotel, London. Nearly 700 attended the function which was reported in these columns last week

S.W. Board's Displays

CONTESTANTS in the third annual competition to provide the best showroom window display in the S. Western Electricity Board's area have begun to show their ideas. Judging in the preliminary rounds of the competition took place last week when 94 service centres were involved. The theme of this year's contest is "The New Home—and how Electricity can make Life Easier for those Living in it." The early rounds involve the selection of four service centres from each sub-area, which displays will then go forward to the Area final.

"THE HAPPY FAMILY"

THE fantastic comedy of the above title, which was presented at the Fortune Theatre last week by the G.E.C. Dramatic Society, was a most popular and enjoyable play. It concerns a cockney family who are threatened with eviction by plans for the Festival of Britain. As Henry Lord, the shop owner, William Peacock gave a splendid performance (aided by Winston, the rabbit), while Florence Scantlebury as Lilian, his wife, also deserves special mention together with Shirley Linge as Marina, the young daughter.



Counter display aids produced by Thorn Electrical Industries, Ltd., as part of their autumn lamp campaign. That on the left measures 33½ in by 14½ in. The card on the right measures 18¾ in by 27 in.

Wholesalers' Meeting

ONCE again the Council of the Electrical Wholesalers' Federation met in Scotland at the invitation of the Scottish Section. As in 1950 the venue was North Berwick and following the practice in previous years, members of the Councils of E.L.M.A. and the Rubber and Thermoplastic Cable Manufacturers' Association also attended. Apart from business proceedings there were golf competitions, tours of the district and the dinner as guests of the Scotsmen.

An International Survey

THE fourth International Gathering of Associates and Distributors of the Driver-Harris Group of Companies was held at Alderley Edge, Cheshire, earlier this month. It took the form of a four-day Technical Development Conference which surveyed the company's alloys and their expanding fields of application in numerous lands. The conference was attended by 50 associates and distributors from several European countries as well as from the U.S., South Africa and the Argentine.

NEWS IN BRIEF

The Falcon Association, comprising past apprentices of Brush Electrical Engineering Co., Ltd., held its third annual reunion at Loughborough recently; 125 members attended.

Fifth annual meeting of the Scottish Section of the Association of Public Lighting Engineers will take place at Prestwick and Ayr on November 7.

Ontario Retail Hardware Association is holding its 48th National Show in the Automobile Building of the Canadian National Exhibition Buildings in Toronto between February 2 and 5 next.

A motion asking the Transport Committee to consider scrapping trams on two routes in Aberdeen and offering one route to private enterprise, was defeated by 20 votes to 6 at a recent meeting of the town council.

Annual dinner of the Electrical Contractors Association will be held at Grosvenor House, Park Lane, W.1, on January 28. Tickets, available on application, are 35s.

Court of Appeal has postponed their hearing of the River Derwent pollution case on the application of the Pride of Derby and Derbyshire Angling Association and the Earl of Harrington. Appellants are the Derby Corporation, B.E.A. and British Celanese Ltd. Hearing will not be before December 1.

The 1952 Year Book of the E.I.B.A. is now available on application.

Clyde Navigation Trustees have decided to modernise the electrical installation at Rothesay Dock at an estimated cost of £131,000.

The 25th annual dinner of E.P.E.A.'s S. Eastern Division will take place at Connaught Rooms, London, on November 28. Tickets for members are £1 5s., and for non-members, £1 17s. 6d.

Numerous activities of the G.E.C. overseas have been gathered together in a new booklet just produced by the company for their shareholders.

Winners of Philips Electrical Ltd.'s Radio Show competition have been announced. Over 13,000 entries were received and contestants were asked to choose the three best designs of seven radio sets, name the first four important features of the company's radiograms, and choose a name for Philips projection television. Prizes were a TV set, a radiogram and a radio set.

Micanite and Insulators Co. Ltd.'s works fire brigade won two trophies at the annual tournament of the London Private Fire Brigades' Association. Thirty-one teams competed.

"Lighting to Measure," a booklet which tells the householder how to obtain the best illumination by simple measurements was the basis of this latest B.T.H. window display at the company's London offices

Electric Supply News . . .

B.E.A. Supplies

During September, the total energy sold by the B.E.A. to all customers was 4,387m units, an increase of 8% on the corresponding month of 1951. Adjusted to normal weather and standard working days, this increase becomes 2·5%.

Individual purchases from the B.E.A., together with sales made directly by the Authority, are given in the table below. For areas in which industrial consumers take more than half the energy sold, there was a 5·6% increase on last year; for other areas, a 12·6% increase.

Board	September total in million units	% inc. or dec. Sept. 1951
London	392·4	+11·0
South Eastern ...	238·3	+12·2
Southern	290·6	+17·1
South Western ...	136·4	+10·6
Eastern	391·9	+12·3
East Midlands ...	343·8	+ 9·2
Midlands ...	468·2	+10·0
South Wales ...	267·9	+ 5·6
M. and N. Wales	261·8	− 2·1
Yorkshire ...	458·8	+11·6
North Eastern ...	280·4	+ 3·4
North Western ...	482·9	− 1·0
S.E. Scotland ...	92·5	+10·4
S.W. Scotland ...	221·6	+ 8·1
Direct sales ...	59·7	+ 7·6
Grand Total ...	4,387·2	+ 8·0

Bingley

Approval has been given to a scheme to supply electricity to the Drake Hill, High Eldwick and Low Springs district of Bingley. As soon as prospective users have agreed to terms, work is expected to start. Consumers will be asked to pay a minimum charge for electricity during a period of five years.

Co. Down

Representatives of the Electricity Board of Northern Ireland met local residents of the Ballylough, Carnacaville areas recently to discuss the provision of electricity for the rural area between Ballylough and Carnacaville. Mr. T. G. Christie, chief engineer, Major T. G. Jones, sales manager, and Major C. K. Irwin, district engineer, representing the Board, pointed out that owing to present financial stringency it would not be feasible to instal a scheme unless the economic return justified its provision and that it would depend on the number of users in the area and the amount of equipment installed. It was decided to re-canvass the area to ascertain if those interested in having electricity would be prepared to have sufficient equipment and would consume sufficient current to justify proceeding with the proposed scheme.

Doncaster

Work on the new power station at Crimpsall Ings is proceeding according to schedule and the first generator is expected to be in operation by next June, according to recent reports reaching us from Yorkshire. By the end of 1953, the first half of the project is expected to be complete. The final stage is scheduled for completion by March, 1956. We understand that Mr. W. H. Dunkley, chief generating engineer (construction) of the Yorkshire Division of B.E.A., has stated that he was confident the work would be finished according to the time-table. Work on the station has fallen behind slightly, in recent weeks, because of difficulties in obtaining steel.

Eire

The Electricity Supply Board has now almost completed plans for a hydro-electric scheme on the River Clady, in Co. Donegal, we understand. The power station to be constructed near the mouth of the Gweedore River will have a generating capacity of 4,000 kW, giving an estimated yearly output of 13½ million units. To this station will be diverted, through a head race canal about 1¾ miles long, the major portion of the flow of the River Clady. It is expected that the next few months will see work begun on the preliminary operations on the sites of the dam, head race and power stations.

North Scotland

The N. of Scotland Hydro-Electric Board has announced an extension of their Cowal scheme to meet the district's increased demand for electricity. This scheme (No. 69) comprises a series of aqueducts and short tunnels which will collect headwaters of a number of streams flowing into Loch Riddon. Waters will be diverted through the hill to an aqueduct and from there through a pipe to the power station on the shores of Loch Striven. It will be recalled that the Cowal hydro-electric scheme was officially opened just over a year ago. It has an estimated annual output of 14 million units and the extension will increase that output by some 4,600,000 units a year.

Monmouthshire

Reasons for their refusal to recommend planning consent for the B.E.A. to build a 120 MW power station between Rhiwderin and Lower Machen have been given by the West Monmouthshire Area Planning Sub-committee. The majority of reasons concern the needs of agriculture. The proposed station would be in an area scheduled for agricultural and rural purposes only, and it would involve a loss of some 120 acres to agriculture at a time when national food production was vital. In addition, flue ash from chimneys would adversely affect both food production and surrounding woodlands together with residential amenities of adjoining property owners.

Objections have been raised also on the grounds that the buildings would be incongruous in their proposed setting, that they would create a precedent which might lead to further industrialisation.

and that the station would involve the construction of further transmission lines.

Northamptonshire

The proposed 22-mile transmission line across the country from Staythorpe to Elstree, part of a super-grid, is likely to meet with strong opposition from nearby iron-ore companies. The line is expected to run from Market Harborough, through Desborough, Rothwell and Earls Barton to Bozeat. The companies are afraid it will interfere with their workings. No local authorities in Northamptonshire have objected to the line to date.

LIGHTING SCHEMES

Birmingham.—The Public Works Committee has approved the purchase of floodlighting equipment for a number of public buildings as part of the city's Coronation celebrations.

Chichester.—A scheme is being prepared for improved lighting in St. Paul's Road.

Doncaster R.D.C.—Trunk-road lighting is to be provided on Great North Road, at an estimated cost of £11,900.

Newcastle-on-Tyne.—T.C. has received consent to borrow £944 for the provision of 32 street lamps on the Fairways housing estate.

Redditch.—The M.o.T. has now agreed, after strong representations, to the installation of improved street lighting in Astwood Bank. Estimated cost is £3,000.

Stone U.D.C.—The street lighting scheme for the Lichfield-road Estate has been approved. The Housing and Highways Chairmen are to discuss the type of lighting to be employed.

Stourbridge—Subject to approval of the M.o.T., the T.C. propose to extend the electric street lighting along the main road from Stourbridge to Lye Cross and along High Street, Lye, to the Hayes, at a cost of nearly £4,000.

Wrexham.—The Council is pressing the M.o.T., for authority to proceed with its lighting scheme early next year because, it is stated, poor trunk lighting is a danger to public safety.

Questions in Parliament . . .

Amending the Factory Act

An amendment to the Factories Act was suggested to the Minister of Labour last Thursday which would extend provisions of the Act to shop assistants, warehousemen and others operating power-driven machinery. Many thousands of workers in the distributive trades came into daily contact with dangerous machinery, but they had no similar remedies as those already covered by the Act, it was stated. The Minister rejected the proposal.

Deferment from National Service

Numerous questions were put to Sir Walter Monckton last week concerning the policy towards granting deferment to men liable for National Service. The Minister said that highly skilled apprentices in priority establishments were given special consideration. This concerned the rearmament programme primarily, but also involved important export industries. Answering further questions, he said deferment was granted for professional studies for the period necessary to obtain the desired qualification, and for industrial apprenticeships, until the completion of training, provided that would be before the man reached the upper age limit of liability for call up.

Census of Production

The Parliamentary Secretary to the Board of Trade told the House at question time that the 1952 and 1953 Censuses of Production would be based on sampling methods in order to reduce statistical work to a minimum. A large proportion of the smaller and medium-sized establishments would not, therefore, have to make returns. In a written answer on the same day, Mr. H. Strauss said that the simplification would also include the answering of fewer questions. He added that there was no intention of taking a second Census of Distribution in the near future.

Capacity of Private Plant

Among the questions asked during the Parliament's first sitting after the summer recess on the Census of Production, was one inquiring as to whether the private generating plant capacity available in the U.K. had been established from the returns. It was stated that the 1952 questionnaire did seek that information, and that the forms had been received and were now being analysed.

Imports of Lead

Following the reopening of the lead market, Mr. R. A. Butler, answering questions last week, said it was not possible to estimate precisely how much dollar and non-sterling currency would have to be made available to lead importers during the next three years. It was not expected to differ greatly from the amounts in previous years. Asked about the possible tendency of importing more lead from dollar countries, he said, the matter had been borne in mind but a large proportion of our imports came from the sterling area.

Future Debates

Outlining the business of the House on Thursday, Mr. Harry Crookshank stated that the Cinematograph Bill would probably be completed during the week beginning next Monday. It would be before the Lords in the committee stage tomorrow (Friday). At the request of the Opposition, it was hoped to allocate one day before Prorogation for debate on the Ridley Committee's report.

Company Activities . . .

Acrow (Engineers)

Preliminary statement shows that trading profit rose from £331,453 to £390,750. Results show also that taxation takes £223,248 (*£179,057*). Depreciation is allowed £29,061 (*£15,234*), making net profit £133,050 (*£131,229*). Ordinary dividend takes £68,775 (*£46,175*), leaving £117,434 (*£114,205*) carried forward. Current assets have grown to £634,764 from £540,437. The Directors recommend a final Ordinary dividend of 40% (*30%*) making 60% less tax (*50%* less tax) for the year ended March 31.

H. J. Baldwin & Co.

Consolidated trading profit for the year to March 31 last is £81,113 (*£45,435*). The final dividend is 10%, making 20%. Last year the distribution was 25%, including 15% final on increased capital. After taxation of £39,006 (*£21,316*), and other charges, including bank interest of £5,359 (*£1,725*), the net profit is £25,986 (*£16,600*). There is £36,578 (*£28,122*) carried forward.

Cable and Wireless (Holding) Ltd.

This company has outstanding £3,632,662 3% unsecured loan stock (of which £2,257,683 is due to be redeemed on December 31 next and the balance by December 31, 1953) and £4,000,000 4% unsecured loan stock due to be redeemed by December 31, 1960.

In order to place its loan capital on a more permanent footing, the company proposes to issue £3,632,662 5% Debenture stock 1972/77 for conversion or repayment at par on December 1 next of whole of the outstanding 3% loan stock. Applications may be accepted from other stockholders for any balance of this issue after applications from the 3% Loan stockholders have been satisfied.

The company proposes also to offer the 4% Loan stockholders the option of converting up to 50% of their holdings into additional 5% Debenture Stock 1972/77, to be issued to the extent required to meet conversion applications from such holders.

Davis and Timmins

The directors propose to make a one for five share bonus. Present capital is £325,000 in 100,000 6½% Preference £1 shares and 900,000 Ordinary 5s. shares. This would then capitalise the sum of £45,000.

Holophane Ltd.

Trading profit for the year amounts to £141,234 (*£89,809*) from which is deducted the provision for taxation of £87,500 (*£51,250*), leaving a balance of £53,734 (*£36,961*) to be carried down. This, together with the amount of £24,528 (*£36,442*) brought forward from last year, makes available the sum of £78,262 (*£73,403*). Fixed Assets are quoted as £30,944 (*£31,195*), Investments £19,220 (*£19,223*) and Current Assets £399,894 (*£312,959*). The Directors recommend the payment of a final dividend of 12½%, making with the interim of 7½% paid in June, 20% for the year. It is proposed to transfer £25,000 to general reserve and £1,000 to maintenance reserve.

Murex

Application has been made to the Capital Issues Committee for permission to issue 200,000 Ordinary £1 shares to be offered as rights to Ordinary stockholders. Issued capital would then amount to £2,200,000.

Serck Radiators

Group profit for the period August 5, 1951, to August 2, 1952, is £366,394 (*£369,494*). Taxation however, takes £216,138 (*£197,015*) and replacement and obsolescence £10,000 (*£19,000*) of the net balance of £140,256 (*£153,479*), the parent company receives £133,841 (*£149,573*). Dividends take £47,250 (*same*) and appropriation for general reserve is £75,000 (*same*). Provision is made for taxation of £5,500 (*against £27,500*), and there is left for carrying forward the sum of £41,403 (*£35,312*). A dividend of 10% (*same*) makes the total for the year 15% (*same*).

Waite and Son

This firm, manufacturing lamp shades and standards, reports a trading profit of £42,538 (*£70,501*) for the year to March 31 last. After charging directors' emoluments, loan interest, bank interest and £6,755 (*£7,275*) for depreciation, the balance is £25,654 (*£51,603*). To taxation £15,774 (*£29,245*), loan redemption reserve £4,000 (*same*), general reserve £3,000 (*£9,000*), pensions reserve nil (*£2,000*), and payment of 10% dividend (*same plus 5% bonus*), there is £4,679 (*£5,474*) carried forward. Mr. H. J. Waite, chairman, states that the turnover for the current year to date is substantially below that for the corresponding period last year, but a distinct improvement in order receipts has been evident in recent weeks. It is, however, doubtful whether the trading result will be equal to last year's figure.

Dividends Declared

Babcock and Wilcox.—Interim dividend of 7½% (*same*). Total last year including bonus 3% was 18%.

British Electric Traction.—Interim dividend of 10% (7½%).

London Electric Wire.—Interim dividend payable October 31 of 5% on Ordinary capital of £1,000,000.

Streamline Filters.—Dividend of 5% (*10%*) making total for year (1951) of 20%. Also Interim dividend of 5% for 1952 (*same*).

Commercial Information

CONTRACTS OPEN

HOME

Oct. 27.—Manchester. Electrical installation in shops, maisonnettes and garages at Wythenshawe. City Architect, Town Hall. Deposit £1 1s. (See Oct. 9 issue).

Oct. 27.—West Riding. Conversion from gas to electricity at Brighouse Cart Green J.M. and I. school. County architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £2 2s.

Oct. 27.—West Riding. Renewal of electrical installation at Mexborough and Wath-on-Dearne grammer schools. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £2 2s. in each case.

Oct. 28.—Dublin. Tenders previously invited for electrical installations at Southern Regional Sanatorium now required by above date. P. O'Cinneide, Dept. of Health, Custom House, Dublin.

Oct. 29.—Dublin. Supply and installation of electric lifts at St. Kevin's Hospital. N. Mathews, Consulting Engineer, 42 Fitzwilliam Place.

Oct. 30.—Belfast. Electrical installation of part of chemistry dept. of College of Technology. Education Architect's Dept., 40 Academy Street.

Oct. 30.—Co. Down. Electrical installation at Victoria primary school, Newtownards. Architects are W. D. R. and R. T. Taggart, Castle Arcade Buildings, Belfast. Deposit £5 5s.

Oct. 31.—Armagh U.D.C. Internal lighting and power installations in 38 houses and block of flats on Alexander estate. Council Offices, City Hall. Deposit £2 2s.

Oct. 31.—Ashford (Kent) U.D.C. Supply and erection of 12 Class "A" and 23 Class "B" concrete street lighting columns with lanterns. Surveyor, 5 North St. Deposit £1 1s.

Oct. 31.—Bristol. Supply of laboratory and workshop equipment for electrical power supply and experimental machine sets, electronics, etc., for College of Technology. G. H. Sylvester, Chief Education Officer, The Council House, College Green. (See Sept. 25 issue.)

Oct. 31.—Bury T.C. Supply and/or erection of equipment to convert unlighted pedestrian crossing beacons to illuminated flashing beacons. Borough Engineer, Town Hall.

Oct. 31.—Northern Ireland. Installation of lighting and bell-push systems at Coleraine Hospital. Secretary, Coleraine and Portrush Management Committee, Coleraine Hospital.

Oct. 31.—Wakefield. Supply and erection of (*a*) 28 100-W tungsten lanterns and 15-ft concrete columns on Kettlethorpe estate, (*b*) 60 125-W H.P.M.V. lanterns on same along Thornes and Batley Rds., and (*c*) 15 125-W H.P.M.V. lanterns on same in Agbrigg Rd. City Engineer, Town Hall. (See Oct. 2 issue.)

Nov. 3.—Bath. Supply and installation of equipment (washing machine, etc.) for communal laundry in block of 42 flats. Jared E. Dixon, Town Clerk, Guildhall. (Advertised in this issue.)

Nov. 3.—Manchester. Alterations and additions to electrical installation at Queen's Rd. bus garage. City Architect, Town Hall. Deposit £1 1s.

Nov. 3.—Longbenton U.D.C. Electrical work in 20 houses on Wideopen estate. A. E. Sweetman, Engineer and Surveyor, Council Offices, Forest Hall, Newcastle-on-Tyne. Deposit £2 2s.

Nov. 3.—Northern Ireland. Electrical installations in 8 shops, 26 flats and 26 old people's dwellings at Tonagh Park, Lisburn, N. Ireland Housing Trust, 12 Hope St., Belfast, Deposit 10s.

Nov. 3.—Swansea T.C. Electrical installation in 116 houses on Chase estate. Applications by above date to Borough Architect, The Guildhall. Deposit £2 2s. (Advertised in this issue.)

Nov. 5.—Swansea T.C. Electrical installation in 56 flats at Penlan. Applications by above date to Borough Architect, The Guildhall. Deposit £2. (See Oct. 16 issue.)

Nov. 7.—Antrim. List of supplies required by S. Antrim Hospital Management Committee for 1953 includes electrical repairs and requisities. Secretary of Committee, Dublin Rd., Lisburn.

Nov. 7.—Hornchurch U.D.C. Provision and installation of equipment for illumination of nine pedestrian crossings. Engineer and Surveyor, Council Offices.

Nov. 7.—Manchester. Electrical installation at 60 Palatine Rd. for Children's Committee. City Architect, Town Hall. Deposit £1 1s. (See Oct. 2 issue.)

Nov. 8.—Liverpool. Supply of equipment for lighting about 120 pedestrian crossings. City Engineer and Surveyor, Municipal Buildings. (Advertised in this issue.)

Nov. 8.—New Windsor T.C. Supply of (among other items) electric lamps, fittings and cable for 1953. G. S. Baker, Borough Engineer, Kipling Memorial Bldg., Alma Road.

Nov. 8.—Tewkesbury T.C. Supply and installation of 400 W mercury lamp units along 2,700 yd of A.38. Separate tenders invited for (*a*) 13 concrete columns, one wall bracket and resiting of existing columns; and (*b*) 61 lanterns and auxiliary gear. Engineer and Surveyor, Municipal Offices. Deposit £2 2s.

Nov. 10.—Dewsbury T.C. Supply of a 4,000 g.p.m. vertical spindle centrifugal sewage pump, and two 2,000 g.p.m. and one 1,000 g.p.m. horizontal centrifugal recirculating pumps, with motors and all ancillary electrical work and equipment. Borough Engineer and Surveyor, Municipal Bldgs.

Nov. 10.—Goole (Yorks) T.C. Electrical work in (*a*) 31 houses and six bungalows in Oxford Rd. and Ilkeston Ave., and (*b*) 79 houses in Murham and Ilkeston Aves., etc. Thos. Waterfall, Borough Surveyor, Municipal Offices. Deposit £2 2s.

Nov. 12.—Manchester. Supply of 200 flashers for illumination of pedestrian crossing beacons. City Surveyor, Town Hall. Deposit £1 1s.

Nov. 13.—Ellesmere Port U.D.C. Tenders invited for lighting of pedestrian crossings. Council's

Engineer and Surveyor, Queen St. Deposit £1 1s. (Advertised in this issue.)

Nov. 14.—Manchester. Electrical installation in Central Kitchen, Crossley St. City Architect, Town Hall. Deposit £1 1s. (See Oct. 16 issue.)

Nov. 17.—Stretford T.C. Electrical installation in 146 flats and maisonnettes on Stretford Rd. and Thomas St. sites. A. H. Perry, Borough Surveyor, Town Hall. Deposit £2 2s.

Nov. 21.—Belfast. Supply and erection of workshop machinery equipment, including 12¾ in. and 6¾ in. centres surfacing and screwcutting of gap bed lathes, radial drilling machine, sensitive drilling machine, and 24-in. shaping machine, for Harbour power station. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (Advertised in this issue.)

Nov. 24.—Boston R.D.C. Electrical pumping machinery required for Bulterton Re-Pumping Station. S. M. Forman, clerk of district council, 126 London Rd. Deposit £3 3s.

Nov. 25.—Newbiggin-by-the-Sea U.D.C. Electrical work in 12 houses on Spital Estate. H. Selby Robson, Surveyor to Council, Council Offices. Deposit £2 2s.

Nov. 28.—Stepney B.C. Electrical installation in blocks of flats in Sidney St. scheme. Sydney Clough, Son and Partners, Devonshire Close, 39 Devonshire St., W.1. Deposit £2 2s. (Advertised in this issue.)

Nov. 30.—Tottenham B.C. List of supplies required during year beginning April 1, 1953, includes electric lamps. Applications to M. Lindsay Taylor, Town Clerk, Town Hall, N.15.

No date stated.—Bridlington. Electrical work in (*a*) Admin-block at Bampton Lane Hospital and (*b*) Westgate Lodge, Nurses' Home, Avenue Hospital. Documents from the secretary of Scarborough, Bridlington, Malton and Whitby Group Hospital Management Committee, Scarborough Hospital. These are separate contracts.

No date stated.—Preston T.C. Provision of new electrical installation at Deepdale primary school. Borough Engineer and Surveyor, Municipal Bldg. Deposit £1.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

Nov. 20.—Uruguay. Two portable units for inspecting high tension insulators in service, for line tensions up to 165 kV, required by Usinas Electricas y Telefonos del Estado. B.o.T. (Ref: CRE 34574/52).*

Nov. 25.—Uruguay. Supply of 50 outdoor transformers between 50 kVA and 200 kVA and 96 indoor transformers between 3,000 kVA and 600 kVA. Usinas Electricas y Telefonos del Estado, Paraguay 2431, Montevideo. B.o.T. (Ref: CRE 34576/52).*

Nov. 27.—Australia. Supply and maintenance of 33 kV metalclad switchgear of the indoor single busbar type, and control panel. City Electric Light Co. Ltd., Boundary Rd., Brisbane. B.o.T. (Ref: CRE 34403/52).*

Dec. 1.—Egypt. State Railways, Telegraphs and Telephones require 143 kilometres underground armoured, and 12 kilometres underground unarmoured, cables. Details from Chief Inspecting Engineer, Egyptian Govt., 41 Tothill St., London S.W.1.

Dec. 12.—Australia. Supply of 12 33 kV 3-phase, 400 A outdoor type oil circuit-breakers for Brisbane City Council's Dept. of Electricity. Documents from Chief Engineer and Manager of Dept., Kelvin House, Adelaide St., Brisbane, at 10s. 6d. per copy.

Dec. 15.—Portuguese W. Africa. Supply of electrically operated travelling cranes and conveyors for use at new workshops of Luanda Railway. Directorate of Overseas Development, 13 Praca do Principe Real, Lisbon. B.o.T. (Ref: CRE 34192/52).*

Dec. 24.—Uruguay. Supply of transceptor equipment, radiotelephony equipment, radio telephonic equipment and telegraphic transmitter for Administracion Nacional de Puertos. B.o.T. (Ref.: CRE 33023/52).

CONTRACTS PLACED

Barrow-in-Furness T.C. Electrical installation at St. Aloysius' R.C. school, R. Hadwin and Son, £5,822.

Darlington T.C. Sodium street lighting in Haughton Rd., N.E. Electricity Board, £9,000.

Derby. Electrical work in additional accommodation at Etwell Rehabilitation Centre, Barnet and Soans Ltd, £3,100.

Kensington B.C. Electrical installation at Talbot Grove House, G. N. Watts Ltd., £2,012.

Your Queries — Answered

"Silent Electric" vacuum cleaner, makers of? M.B.—We presume this refers to "Electrix Silent," made by Electrix Ltd., Sterling Works, Dagenham. (24175)

"Shelvador" refrigerators, suppliers of? M.A.—A. J. Balcombe Ltd., 52 Tabernacle St., E.C.2. (24182)

"Gensurco" hairdryers, makers of? Y.B.—General Surgical Co. Ltd., Gensurco House, Rosebery Ave, E.C.1. (24189)

"Elpo" circuit-breakers, makers of? H.Q.—Ellenbergers and Poesgen, G.M.B.H., Hersberuckerstrasse 400, Altdors (Bei Neunberg). The agents are Hilbert and Kett Ltd., 20/23 Holborn, E.C.1. (24193)

"May-Vale" fires, makers of? S.E.—May-Vale Electrical Manufacturing Co. Ltd., May-Vale Works, Southsea Ave., Leigh-on-Sea. (24206)

Egg-shaped iron, makers of? N.P.—Modinstal Electric Ltd., 2 Oldham Terrace, High St., Acton, W.3. (24219)

"Smart Bristow Faradisc" coil, suppliers of? R.B.—Medical Supply Association Ltd., 53 Park Royal Rd., N.W.10. (24228)

The above are selected from questions we have answered this week. If you have a query, send it to us.

TRADE NOTES

Beama Contract Price Adjustment Formulae. *For Electrical Machinery and Equipment.* For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at Oct. 18, 1952, shall be deemed to be 134s. (*b*) "Cost of Material"—index figure for Materials used in the Electrical Machinery Industry published in the Board of Trade Journal on Oct. 18, 1952, is 168·3.

For Turbo-Generating and Allied Plant. For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at Oct. 18, 1952, shall be deemed to be 134s. (*b*) "Cost of Material"—the index figures published in the Board of Trade Journal on Oct. 18, 1952, are: Materials used in Mechanical Engineering Industries—151·4. "Blast Furnaces and Iron and Steel Melting and Rolling (40 and 41)"—142·2. The price of brass condenser tubes ¾ in. o/d, 18 SWG published in The Metal Bulletin on Oct. 17, 1952, is 3s. 11¼d.

For outstanding Contracts covered by the B.o.T. Intermediate Products Index. For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at Oct. 18, 1952, shall be deemed to be 134s. (*b*) "Cost of Material"—the index figure for Intermediate Products published in the Board of Trade Journal on Oct. 18, 1952, is 361·0.

Changes of Address. Among the numerous removals being undertaken by the B.E.A. is the move of the Authority's public relations section which is now at Administration H.Q., Winsley St., London W.1. Tel.: Museum 4040. As from Nov. 1, the new address of the Purchasing Dept. of the London Division of B.E.A. will be Generation House, Gt. Portland St., London W.1. Tel.: Museum 6844.

Offices and sales organisation of A.C. Morrison (Engineers), Ltd., has moved to the company's Cliff Works, Burton-on-the-Wolds, nr. Loughborough. Tel.: Wymeswold 295/6.

Indian Imports. The Indian Government has banned the import of 61 items. Included in the list are radio sets.

New Branch. The International Refrigerator Co., Ltd., have established their sales and service organisations in the north-western district at 99 Corporation St., Manchester. Tel.: 8441/2/3 and 0377/8.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	285 0 0	£280 0 0
LEAD, good soft pig (foreign)	85 0 0	112 0 0
" "English" quality ...	85 2 6	
TIN (99·99·76%) ... ...(Cash)	953½-955	—
" (3 months)	942½-943	—
ALUMINIUM, commercial purity (del.)	166 0 0	—
ZINC	118 0 0	108 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.) ...	54 0 0	—
Mild Steel Tape (0.04 in.)	39 15 0	—

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Besson and Robinson Ltd., 103 Cannon St., E.C.4. Electricians, electrical, electronic, telegraphic, telephonic, radio, wireless, television, mechanical, automobile and general engineers, etc. Cap.: £1,000. Dirs.: A. F. Woolsey, A. P. Besson, D. Robinson and D. D. Mathieson.

Caldwell Heaters (Canada) Ltd., 2 Salisbury Court, E.C.4. Sellers, hirers, importers, exporters, manufacturers of and dealers in mechanical and electrical devices and appliances for vehicles, aircraft, watercraft and stationary engines of all kinds, etc. Cap.: £500. Dirs.: to be appointed by subs. Subs.: D. E. Pegler, 7 Pendennis Rd., Streatham, S.W.16; Margaret A. Bird, Valebridge, Valebridge Rd., Burgess Hill, Sussex.

Caldwell Heaters (Sales) Ltd., 2 Salisbury Court, E.C.4. Sellers, hirers, importers, exporters, manufacturers of and dealers in mechanical and electrical devices and appliances for vehicles, aircraft, watercraft and stationary engines of all kinds, etc. Cap.: £2,900. Dirs.: to be appointed by subs. Subs.: D. E. Pegler, 7 Pendennis Rd., Streatham, S.W.16; Margaret A. Bird, Valebridge, Valebridge Rd., Burgess Hill, Sussex.

Caldwell Heaters (U.S.A.) Ltd., 2 Salisbury Court, E.C.4. Sellers, hirers, importers, exporters, manufacturers of and dealers in mechanical and electrical devices and appliances for vehicles, aircraft, watercraft and stationary engines of all kinds, etc. Cap.: £900. Dirs.: to be appointed by subs. Subs.: D. E. Pegler, 7 Pendennis Rd., Streatham, S.W.16; Margaret A. Bird, Valebridge, Valebridge Rd., Burgess Hill, Sussex.

E.R.E.S. Ltd., 64-82 Higham St., Walthamstow, E.17. Electricians, mechanical engineers and manufacturers of and dealers in electrical apparatus and goods, etc. Cap.: £750. Dirs.: A. L. George, S. J. George and R. B. Webb.

Flurotronic Ltd., 2 Beehive Parade, Eastern Av., Ilford. Electrical engineers, manufacturers of and dealers in electric lighting equipment, etc. Cap.: £100. Dirs.: B. A. Davis and W. J. Wright.

Fuel Services (Barnstaple) Ltd., 42 Boutport St., Barnstaple, Devon. Service engineers and factors of and dealers in electrical and automobile equipment and accessories, fuel pumps and injectors for diesel engines, etc. Cap.: £1,000. Dirs. R. W. B. Tamlyn and P. R. Giblett.

George Hammond (Electrical) Ltd., Aberdeen House, Arundel Rd., Angmering, Sussex. General electrical engineers and contractors, etc. Cap.: £500. Dirs.: Mrs. D. E. Hammond and G. A. Aldridge.

Hatfield Instruments Ltd., 175 Uxbridge Rd., Hanwell, W.7. Manufacturers of and dealers in and repairers and hirers of electrical, optical and mechanical apparatus and accessories and components of all kinds, in particular electrical, optical, mechanical and radio measuring instruments, etc. Cap.: £500. Dirs.: R. H. Hatfield and Mrs. E. V. Hatfield and T. K. Phelan.

Lockit Equipment Ltd., 9 Cavendish Sq., W.1. Mechanical, electrical, motor, aeronautical, constructional, marine and general engineers, etc. Cap.: £5,000. Dir.: W. S. Howell.

Magnetic Sound Diffusion Services Ltd. Cap.: £100. Dirs.: To be appointed by subs. Subs.: Marjorie P. Sunderland, 98 Chase Rd., Southgate, N.14, and L. A. Smith, 1 Princes St., London, W.1.

BUSINESS PROSPECTS

HOME

Aberystwyth R.D.C. It is proposed to build 70 houses at Commins Coch and 66 dwellings on five other sites.

Ashington U.D.C. Erection of 80 houses in Darnley Rd. Council's Surveyor, Town Hall.

Barking. Tenders likely to be invited soon for installation of fluorescent lighting in classrooms at Monteagle school.

Berkhamsted U.D.C. Approval granted for erection of 50 dwellings to complete Durrants estate.

Bolton (Lancs). Next year's building programme includes first phase of Breightmet secondary school costing £160,000; instalment of English Martyrs' R.C. secondary school to cost £132,000; and further accommodation costing £17,000 at Oldhams Lane primary school.

Boston (Lincs) R.D.C. It is proposed to build 200 houses on 17 sites.

Chelmsford R.D.C. Plans proceeding for erection of 76 houses on Sawkins estate, Gt. Baddow, and 24 in South St., Gt. Waltham.

Coseley U.D.C. Erection of 96 houses on Mount Rd. site, Lanesfield. J. C. Roper, Clerk of Council, Council House.

Crewe. Tenders to be invited for erection of 80 houses on Wistaston Green estate instead of for 30 houses as originally planned.

Dartford T.C. Erection of 72 dwellings on Temple Hill Neighbourhood Unit. Borough Surveyor, Barclays Bank Chambers, High Street.

The Dearne U.D.C. Erection of 32 houses on Whin Wood estate. F. Baxter, Engineer and Surveyor to Council, Council Offices, Bolton-on-Dearne.

Derby. The Belper and Etwall secondary schools costing £134,640 and £95,040 respectively are included in 1953-54 building programme.

Doncaster. 1953-54 building programme includes the first phase of College for Further Education estimated to cost £120,000.

Dukinfield T.C. Construction of 96 houses on Yew Tree Lane site. E. Barlow, Town Clerk, Town Hall.

Durham. Peterlee Development Corp., Shotton Hall, Castle Eden, is to build another 180 houses in Howletch Lane area.

Goole (Yorks). Scheme approved for renewal of electrical installation at Grammar school. Estimated cost is £3,600.

Luton T.C. Construction of 48 flats in six blocks on Farley Hill estate. Borough Engineer, Town Hall.

Macclesfield R.D.C. Erection of 40 houses on two sites. H. Chadwick, 19 King Edward St.

Mansfield T.C. Erection of 100 houses on Ladybrook Lane estate. Borough Engineer and Surveyor, Carr Bank.

Martley (Worcs). Permission to be given to W. Lusty and Sons Ltd. to extend factory at Berrow Green.

Newcastle (Staffs) T.C. Plans in hand for development of Crackley Bank site at Chesterton comprising some 800 houses.

North Riding. Fresh tenders being obtained for erection of infants' school at Eston. Architects are Tacker and Child, 25 New Bridge St., Newcastle.

Norwich. Construction of 149 dwellings on S. Tuckswood estate. City Architect, City Hall.

Oldham T.C. Tenders being invited for site works for development of Alt estate to accommodate 500 houses. Borough Engineer and Surveyor is A. L. Hobson, Municipal Buildings, 75 Union Street.

Plymouth. Whitleigh is the site for building 54 dwellings.

Reading T.C. Corporation Heating Consultant, Mr. H. A. Sandford, has been appointed electrical consultant for proposed Mid-West secondary school.

Southend. Approval given to erection of further instalment of Westcliff High school next year at cost of about £120,000.

Sunderland. British Railways are planning to spend £30,000 on remodelling part of the railway station. Permission received for building of infants' school on Hylton Red House estate and temporary school at Castletown next year. Construction of new £160,000 abattoir on Sunderland-South Shields Road has been approved.

Waltham R.D.C. A £40,000 electric bakery is to be built in district.

Weardale (Dur.) R.D.C. Site at Wolsingham being sought for erection of 110 houses.

Wednesbury. Plans prepared by Lavender, Twentymen and Percy, Architects, Wolverhampton, have been approved for new church of St. Luke in Paul St. at estimated cost of £33,000.

Wellingborough R.D.C. It is proposed to build total of 100 houses on ten sites. Largest groups being 20 each at Barton and Irchester.

Wigton R.D.C. Erection of 56 houses at Abbey Town is being considered.

Wisbech (Isle of Ely) C.C. has approved the erection of a home for old people at Money Bank, at a cost of £27,000. Scheme for divisional police headquarters at Lynn Rd. police station section, to cost £51,452, is to be submitted to Ministry for approval.

Workington T.C. Plans prepared and tenders expected to be invited soon for erection of 100 houses on Westfield estate.

OVERSEAS

Canada. Donald C. Keddy, Ltd., 53 Upper Water St., Halifax, N.S., are interested in receiving quotations for slotted electricity meters.

Dominican Republic. Sr. George O. Mansfield, P.O. Box 1224, Ciudad Trujillo, wishes to obtain agencies for U.K. manufacturers of electric insulated copper wires and cables, and radio valves.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

B.I. Callender's in design. 707,320. Class 6. Wires, strands and braids all of common metal or of common metal alloys and being non-insulated materials for electrical purposes. British Insulated Callender's Cables, Ltd., Norfolk House, Norfolk St., Strand, W.C.2.

Eidophor. 709,829. Class 9. This registration includes electrical, radio and television apparatus, etc. Dr. Edgar Gretener, A.G., 25 Ottenweg, Zurich, Switzerland.

"Non-Drip." B698,863. Class 11. Refrigerating apparatus for use in connection with fruit squash dispensers and soda fountains. Gaskell and Chambers, Ltd., also trading as Non-Drip Measure Co., Ellison Works, Danbrook Rd., Streatham, S.W.16.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Element Manufacturing Co. (Birmingham) Ltd. Last day for receiving proofs in respect of intended dividends is Oct. 29. Liquidator is R. K. Clark, Official Receiver, Somerset House, 37 Temple St., Birmingham.

Griffiths and Holliday, electrical engineers and contractors, of 36 Waver St., Silloth, and 12 Station Rd., Workington. Partnership between Richard B. Griffiths and George H. Holliday dissolved as from Oct. 1. Debts received and paid by R. B. Griffiths who will continue business.

Thermoray, Ltd. A. Freestone, Le Chene, Common Rd., Claygate, Surrey, has been appointed liquidator, to whom creditors are asked to send particulars by Nov. 10.

Browett Lindley, Ltd. Resolution for voluntary winding-up passed at meeting on Oct. 7, when S. Maddison, "Rockdene," Longmead, Letchworth, was appointed liquidator.

BANKRUPTCY ACTS

First Meeting

Bournemouth. Edward J. R. Tremlett, radio and electrical dealer, of 941 Wimborne Rd., Moordown, Bournemouth. Meeting will take place at Official Receiver's Office, 16 Westwood Rd., Southampton, tomorrow (Friday) at 11 a.m., and public examination at the Law Courts, Stafford Rd., Bournemouth, on Nov. 24 at 10.30 a.m.

Application for Discharge

Ashton-under-Lyne. Frank Simcox, sign and display equipment manufacturer trading at 116 Wellington St., and Bradgate St. Works, Ashton-under-Lyne. Hearing fixed for Nov. 28 at Town Hall, Ashton-under-Lyne, at 10.30 p.m.

Receiving Order

Windsor. Henry M. Pollen, electrical engineer, of 22 Riverside Close, Staines, Middx. Date of receiving order, Oct. 15.

Appointment of Trustee

Nottingham. Samuel L. Brythe, George N. Bryan and Donald Mosley, trading in partnership as Kirkstall Radio and Electrical Service at Kirkstall Lodge, Edwinstowe. Trustee is Roland B. Smith, 3 Alfred St., Leeds.

MEETINGS TO NOTE

THURSDAY, OCT. 23

INST. OF WELDING (N. London Branch).—"New Arc Welding Developments." Dr. H. G. Taylor. At Slough.

I.E.E. (London Utilisation Section).—Chairman's address by J. W. T. Walsh. Savoy Place, W.C.2, 5.30 p.m.

E.P.E.A. (S. West Tech. Group).—"Automatic Boiler Control." Llewellyn Young. Elect. House, Colston Ave., Bristol, 7.15 p.m.

FRIDAY, OCT. 24

INSTN. OF MECHANICAL ENGRS.—"Design and Operation of Dunston B. power station—50 MW turbo-alternators 'Unitized' with Reheater Boilers." A. Howell and J. B. Jackson. Storey's Gate, S.W.1, 5.30 p.m.

INST. OF WELDING (E. Scotland Branch). — "Welding of Alloy Steels." E. J. Mitchell. At Edinburgh.

MONDAY, OCT. 27

I.E.S. (Leeds Centre).—"Lighting the Streets." H. E. G. Watts. L.S.B., 24 Aire St., 6.15 p.m.

I.E.E. (London Radio Section).—Discussion on "Impact of TV on Sound Broadcasting." G. Parr. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (Merseyside and N. Wales Centre).—"Application of Transducters as Relays to Protective Gear." R. K. Edgley and F. L. Hamilton. Town Hall, Chester, 6.30 p.m.

I.E.E. (N.E. Centre).—"275 kV Developments on British Grid System." D. P. Sayers, J. S. Forrest, and F. J. Lane. Neville Hall, Westgate Road, Newcastle, 6.15 p.m.

I.E.E. (S. Midland Radio Group).—"Why Quantum Theory Matters to Engineers." D. A. Bell. James Watt Memorial Inst., Gt. Charles St., Birmingham, 6 p.m.

I.E.E. (N. Staffs sub-centre).—"Use of Electricity in Modern Iron and Steel Works." W. F. Cartwright. King Edward VI School, Stafford, 7 p.m.

I.E.E. (Western Utilization Group).—Visit of Section Chairman, J. W. T. Walsh. S. Wales Inst. of Engrs., Park Place, Cardiff, 6 p.m.

A.S.E.E. (Bournemouth Branch).—"Pyrotenax Cables." G. E. D. Redman. Grand Hotel, Firvale Rd., 8.15 p.m.

E.P.E.A. (London Group).—"Economy in Choice of Switchgear." L. J. Bamber. Caxton Hall, S.W.1, 7 p.m.

TUESDAY, OCT. 28

BRITISH INSTN. OF RADIO ENGRS. (W. Midlands Section).—"Survey of TV Development and its Problems." H. J. Barton-Chapple. Wolverhampton Tech. College, Wulfruna St., 7.15 p.m.

I.E.E. (N. Midland Centre).—"Economic Plant Sizes and Boiler-Set Groupings on British Grid." B. Donkin and P. H. Margen. Royal Station Hotel, York, 7 p.m.

I.E.E. (N.W. Measurements Group).—"Telemetering for System Operation." R. H. Dunn and C. H. Chambers. Engrs. Club, Albert Sq., Manchester, 6.15 p.m.

I.E.E. (S.W. Scotland sub-centre).—"Domestic Electrical Installations: Some Safety Aspects." H. W. Swann. 39 Elmbank Crescent, Glasgow, 7 p.m.

I.E.E. (London Students Section).—"Working Scale Models in Development of Broadcasting Aerials." T. R. Boys. R.E.M.E. Depot, Arborfield, Berks, 7 p.m.

INSTN. OF HEATING AND VENT. ENGRS. (Scottish Branch).—"High Temperature Industrial Radiant Panels." E. B. T. Tanner. 351 Sauchiehall St., Glasgow, 6.30 p.m.

A.S.E.E. (York Branch).—"Some Aspects of High Rupturing Capacity Fuse." L. A. Fry. Creamery Restaurant, The Pavement, 7.30 p.m.

WEDNESDAY, OCT. 29

INST. OF WELDING (London).—"Industrial Application of Resistance Welding." H. E. Dixon. Inst. of Civil Engrs., 6.30 p.m.

I.E.E. (London Supply Section).—Chairman's address by C. M. Cock. Savoy Place, W.C.2 5.30 p.m.

I.E.E. (Sheffield sub-centre).—"Electrical Control of Dangerous Machinery and Processes: Part III, Remote Supervisory Control." W. Fordham Cooper. Tech. College, Scunthorpe, 7 p.m.

I.E.E. (S.E. Scotland sub-centre).—"Domestic Electrical Installations: Some Safety Aspects." H. W. Swann. Heriot-Watt College, Edinburgh, 7 p.m.

I.E.E. (Rugby sub-centre).—"Logical Approach to Problems of Electric Space-Warming." D. H. Parry. (Joint meeting with Rugby Engrng Soc.) College of Tech. and Arts, 6.30 p.m.

A.S.E.E. (Luton Branch).—"Motor Starting and Apparatus applied thereto." R. F. Mathieson. George Hotel, 8 p.m.

THURSDAY, OCT. 30

DUMFRIES ELECTRICAL SOC.—"Domestic Electrical Installations—Some Safety Aspects." H. W. Swann. Ewart Library, Dumfries, 7.30 p.m.

FRIDAY, OCT. 31

I.E.S. (Birmingham Centre).—"Evaluation of Lighting." R. G. Hopkinson. Regent House, St. Philip's Place, Colmore Row, 6 p.m.

I.E.S. (Cardiff Centre).—Annual supper dance at Royal Hotel.

EXHIBITION DIARY

Model Engineer Exbn. Open at New Horticultural Hall, Westminster, until **Oct. 29.**

Dairy Show. 66th Annual Show is taking place at Olympia, London.

International Motor Exbn. 37th show opened at Earl's Court on **Oct. 22** and closes on **Nov. 1.**

Handicrafts and Hobbies Exbn. First national show under this title opens at Central Hall, Westminster, on **Oct. 30** and closes on **Nov. 12.**

Public Works Congress and Exbn. Opens at Olympia, London, on **Nov. 3,** continuing until **Nov. 8.**

Business Efficiency Exbn. is to be held at Kelvin Hall, Glasgow, between **Nov. 4** and **14.**

In historic Canterbury

Architects: Denman & Son, F/A.R.I.B.A., 27 Queen's Road, Brighton, I

Wired throughout with

HENLEY CABLES

by

MEERS (Engineering) Ltd.
Sun Street, Canterbury

Newly built for the Dean and Chapter of Canterbury Cathedral, these handsome buildings possess a charm in keeping with the historic town of Canterbury. The shops originally on the site were destroyed in one of the notorious "Baedeker" bombing raids in 1942.

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

Fractional Horsepower Motors

Foot-mounted

Induction Motors

⅙ H.P. to 1 H.P.

General purpose motors of the ventilated drip-proof pattern for direct starting by double-pole switch—built to exert well above full-load torque at starting—with an exceptional range of alternative mountings, as illustrated.

CONSTRUCTION: these machines are compact and sturdily built; the cores are built up of high grade, low-loss, insulated magnetic-steel laminations. The rotors are of cast aluminium, and are virtually indestructible in service.

BEARINGS: sleeve bearings for horizontal mounting and where ultra-quiet operation is required, ball bearings for fixing horizontally, vertically, or at any angle.

These motors comply fully with BS. 170.

No manufacturer can offer a wider choice in fractional horsepower motors. Whatever the conditions of service or type of drive, there is a BTH motor well suited to the job.

BRITISH THOMSON-HOUSTON

THE BRITISH THOMSON-HOUSTON CO., LTD., RUGBY, ENGLAND

A3108

Member of the AEI group of companies

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY AND COUNTY BOROUGH OF BELFAST

Electricity Department

HARBOUR POWER STATION

TENDERS are re-invited for the SUPPLY, DELIVERY AND ERECTION OF:

WORKSHOP MACHINERY AND EQUIPMENT, including 12¾ in. and 6½ in. centres surfacing and screwcutting gap bed lathes, radial drilling machine, sensitive drilling machine, 24 in. shaping machine and other equipment.

Form of Tender (No. N.1181), conditions and specification, in quintuplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne, 1, on payment of a deposit of five guineas, which will be refunded provided a bona fide tender be lodged and not withdrawn. Extra copies of the contract document may be obtained at one guinea each; this sum will not be returnable. Cheques should be made payable to the Belfast Corporation Electricity Department.

Each tender, in quadruplicate, in sealed envelope marked "Tender for Workshop Machinery and Equipment —Electricity Committee," and endorsed with the name and address of the tenderer must reach the undersigned not later than 4 p.m. on Friday, November 21, 1952.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
October 17, 1952. (B 376)

ELLESMERE PORT URBAN DISTRICT COUNCIL

CONTRACT NO. 138
PEDESTRIAN CROSSINGS—LIGHTING

TENDERS are invited for the lighting of pedestrian crossing beacons in accordance with Ministry of Transport Circulars Nos. 681, dated July 5, 1952, and 685, dated October 7, 1952.

Location map may be seen by appointment, and a set of tender documents, comprising conditions of contract, specification, bill of quantities, and form of tender, may be obtained at the offices of the Council's Engineer and Surveyor, Queen Street, Ellesmere Port, on and after Monday, October 20, 1952, on payment of a deposit of one guinea, which deposit will be refunded on the return of the contract documents, or, in the case of a bona fide tender which is accepted and not subsequently withdrawn, on completion of the formal contract between the council and the successful tenderer.

Sealed tenders in the plain official envelope provided, together with the contract documents, must reach the undersigned by not later than 12 noon on Thursday, November 13, 1952.

P. J. HODGES,
Clerk of the Council.

Council Offices,
Ellesmere Port.
October 14, 1952. (B 375)

CITY OF BATH

LAUNDRY EQUIPMENT
Julian Road Flats, Bath

TENDERS are invited for the supply and installation of equipment for a communual laundry in a block of 42 flats in Bath, consisting of a gas or electric washing machine, hydro extractor and laundry tub. Tenders to be submitted in sealed envelopes endorsed "Laundry Equipment, Phoenix House," to the undersigned on or before November 3, 1952.

JARED E. DIXON,
Town Clerk.

Guildhall, Bath. (B 377)

COUNTY BOROUGH OF SWANSEA

116 TRADITIONAL HOUSES AT CLASE
TENDERS FOR ELECTRICAL INSTALLATION

ELECTRICAL ENGINEERS wishing to tender for the Electrical Installation for 116 traditional houses at Clase Estate, Swansea, are invited to submit their applications, with deposit of £2 to the Borough Architect, The Guildhall, Swansea, on or before November 3, 1952.

Plans, specifications and conditions of contract will be forwarded, when ready, provided applicant gives satisfactory evidence of having previously carried out work of a similar character.

The deposit will be refunded after delivery of a bona-fide tender (which is not subsequently withdrawn) and the return of all documents.

No guarantee is given that the lowest or any other tender will be accepted.

T. B. BOWEN,
Town Clerk.

The Guildhall,
Swansea.
October 15, 1952. (B 374)

CITY OF LIVERPOOL

LIGHTING OF PEDESTRIAN CROSSINGS

TENDERS are invited for the SUPPLY AND DELIVERY of equipment necessary for the lighting of approx. 120 pedestrian crossings, in accordance with M.o.T. Circular No. 685, dated October 7, 1952.

Specification and tender form may be obtained from the City Engineer and Surveyor, Municipal Buildings, Liverpool, 2, upon written application, but must be returned by post to me so as to arrive by 10 a.m., November 8, 1952.

THOMAS ALKER,
Town Clerk.

Municipal Buildings,
Liverpool, 2 (JA. 3028). (B 378)

STEPNEY M.B.C.

SIDNEY STREET HOUSING SCHEME—PORTION "A"
SUB-CONTRACT WORKS
BLOCKS 4, 8, 9, 11, 11b, 13 AND CLUB ROOM

TENDERS are invited for ELECTRICAL INSTALLATIONS in connection with the above blocks of flats and houses.

Forms of tender with conditions, etc., obtainable from Messrs. Sydney Clough, Son & Partners, Devonshire Close, 39 Devonshire Street, London W.1, upon payment of a deposit of two guineas.

Closing date for tenders, noon, November 28, 1952.

WILFRED REEVE,
Acting Town Clerk.

(B 405)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY NO. 812.—SHIFT CHARGE ENGINEER, Burnley Generating Station. Salary £579 to £602 (N.J.B. C.7).

Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before November 1, 1952. (B 359)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF THIRD ASSISTANT ENGINEER (SUBSTATIONS)

Construction Section, Chief Engineer's Department, Area Board Headquarters, Manchester.

APPLICANTS should have had experience in the handling of switchgear transformers and other substation equipment contracts including the examination of tenders and the checking of drawings and diagrams, together with experience in the design and layout of substations, both indoor and outdoor, up to and including 33 kV equipment. Preference will be given to candidates who possess an engineering degree or the H.N.C. in electrical engineering.

Salary scale: £629 to £858 p.a. Grade "AX/EX" 5. N.J.B. conditions.

Persons who applied in response to the advertisement contained in the issue of August 28, 1952 need not reapply as their applications will be considered along with others received in response to this advertisement.

Applications to Establishments Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, by November 1, 1952.

APPOINTMENT OF FIRST ASSISTANT DISTRICT COMMERCIAL ENGINEER

Oldham District.

The successful candidate will be required to assist the District Commercial Engineer in the organisation and control of all commercial staff and functions in the district; supply of information and advice to consumers on electricity utilisation, tariffs, terms and apparatus; organisation and supervision of maintenance work on consumers' premises including emergency service routine testing and repair of domestic appliances, including control of workshops; control of service centres and exhibitions, supervision of consumer records. Membership of the I.E.E. will be considered an advantage.

Salary scale: £806 to £841 p.a. Grade "G" 5. N.J.B. conditions.

Applications to Sub-Area Manager, No. 3 Sub-Area, The North Western Electricity Board, Union Street, Oldham, by November 1, 1952.

APPOINTMENT OF SENIOR DRAUGHTSMAN

Lancaster.

Applicants should have experience in the preparation of plans for new and existing buildings, electrical network diagrams, and the layout and construction of substations. Possession of the O.N.C. in electrical or mechanical engineering, or its equivalent, will be an advantage.

Salary scale: £547 to £651 p.a. Schedule "D", Grade 5. N.J.B. conditions.

Applications to Sub-Area Manager, No. 4 Sub-Area, The North Western Electricity Board, 40-41, Lune Street, Preston, by November 1, 1952. (B 358)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts in the Worcester and District Sub-Area:—

THIRD ASSISTANT DISTRICT ENGINEER

Evesham District

Experience necessary in all branches of distribution work, including construction, operation and maintenance of high and low voltage underground and overhead distribution systems. Technical qualifications desirable. Salary £567 to £579 per annum (N.J.B. Grade E.9).

GENERAL ASSISTANT DISTRICT ENGINEER

Evesham District

Experience necessary in the construction, operation and maintenance of high and low voltage underground and overhead distribution systems. Technical qualifications desirable. Salary £504 to £521 per annum (N.J.B. Grade E.11).

THIRD ASSISTANT DISTRICT COMMERCIAL ENGINEER

Stratford-upon-Avon District

Applicants should have had a sound technical training with practical experience in the sale and installation of domestic and commercial electrical equipment and the wiring associated therewith. The duties also include advising consumers in respect of new supplies, extensions and alterations. Experience in both urban and rural work desirable. Technical qualifications an advantage. Salary £511 to £527 per annum (N.J.B. Grade D.10).

DISTRICT SENIOR CLERK

Stratford-upon-Avon District

Duties involve control of consumers' records and associated matters, contracting, costing and invoicing, payment of wages, meter reading and general clerical and stores work of a district office. Salary £520 to £580 (N.J.C. Grade 3).

Apply in writing within 14 days, stating age, experience, present salary and position to Mr. R. Mallet, Manager, Midlands Electricity Board, Whittington, Worcester.

A. STEPHENS,
Secretary.
(B 387)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following superannuable position. Salary and conditions of service will be in accordance with the National Joint Board Agreement.

BOILER HOUSE SHIFT CHARGE ENGINEER

Brimsdown "B" Generating Station

Salary Class "H," Grade 9, £660-£685 per annum plus London weighting.

Applicants should possess technical qualifications and a knowledge of the theory of combustion and have had experience in the operation of large boilers working at high steam pressures and fired with chain grate stokers and pulverised fuel. Electrical knowledge will be an advantage.

Applications, stating age, details of qualifications and experience, should be addressed to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than November 1, 1952.

W. N. C. CLINCH,
Controller.
(B 380)

CITY OF PORT ELIZABETH

Electricity Department

VACANCY FOR METER MECHANICIAN AND TESTER

APPLICATIONS are invited for the permanent position of Meter Mechanician and Tester at a rate of pay of 3s. 11d. per hour plus cost of living allowance which is at present 55s. 6d. per week for single employees and 72s. 8d. per week for married employees. In addition merit pay will be payable in terms of the conditions of service.

Applicants must be fully experienced and be capable of testing and calibrating polyphase K.W.H., K.V.A. and M.D.I. meters, standardisation of instruments and transformers and be thoroughly familiar with the general routine in the meter department of a modern electricity supply undertaking.

Further details regarding leave, merit pay, pension fund, etc., can be obtained from Messrs. Davis and Soper, Limited, 52 and 54 St. Mary Axe, London, E.C.3.

G. H. BREWER,
Town Clerk.
October 14, 1952. (B 383)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY NO. 813—STATION CHEMIST, Willow Holme Power Station, Carlisle. Salary £677 to £696 (N.J.B. F.7). Candidates should preferably hold a degree of a British University or Associateship of Royal Institute of Chemistry, but consideration will be given to those with H.N.C. who are studying for A.R.I.C. or equivalent examinations. Experience in chemical testing of water, coal and oil in connection with power plant is desirable but not essential, providing the applicant has had good experience in chemical analysis.

Apply to Establishments Officer, British Electricity House, 285 Wilmslow Road, Manchester 20, before November 1, 1952. (B 360)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

ASSISTANT MAINTENANCE ENGINEER (MECHANICAL) required at Bromborough Power Station. Salary £697-£726 N.J.B., H. 8. Superannuable, subject to medical examination.

Applicants should be well experienced in mechanical maintenance of a modern generating plant. Associate membership of the Institution of Mechanical Engineers or equivalent qualification would be an advantage.

Forms of application may be obtained from the Divisional Secretary, Beaconsfield Road, Woolton, Liverpool, to be returned not later than November 7, 1952.

W. A. GALLON,
Divisional Controller.
(B 379)

BRITISH ELECTRICITY AUTHORITY

North Western Division

STATION SUPERINTENDENT required for the new Chadderton (H.P.) Power Station, near Oldham, Lancs (ultimate capacity 240 MW). Applicants should be fully-qualified engineers with experience in the management of a large modern steam power station, preferably with P.F.-fired H.P. boilers. An appreciation of modern concepts of administration, financial control and employee relations, including welfare, training and joint consultation, is desirable. Salary £1,291-£1,351 (N.J.B. J.1.).

Apply, quoting vacancy No. 809, to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before November 8, 1952. (B 356)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

Ayrshire Sub-Area

APPLICATIONS are invited for the following engineering appointments at Sub-Area Head Office, Kilmarnock, all of which are superannuable.

PLANNING AND DEVELOPMENT

1. SENIOR ASSISTANT ENGINEER

Applicants should have been regularly trained with wide subsequent experience in the design of h.v. and l.v. underground and overhead distribution layouts including modern protective systems for rural, urban and industrial supplies. Candidates should possess a degree in electrical engineering and be Corporate members of the I.E.E. or hold equivalent qualifications.

Salary, N.J.B. Agreement, Schedule "A," Grade 4, Class "G," £880-£919 per annum.

2. THIRD ASSISTANT ENGINEER

Applicants should be experienced in the design of modern h.v. and l.v. distribution systems and of protective equipment. They should be Graduate Members of the I.E.E. or possess equivalent qualifications.

Salary, N.J.B. Agreement, Schedule "A," Grade 10, Class "G," £588-£610 per annum.

CONSTRUCTION

3. SECOND ASSISTANT ENGINEER

Applicants should have received a regular training with considerable subsequent experience in the construction of distribution including sub-stations h.v. and l.v. overhead and underground mains up to 33 kV. Candidates should preferably be Corporate Members of the I.E.E. or possess equivalent qualifications.

Salary, N.J.B. Agreement, Schedule "A," Grade 7, Class "G," £704-£733 per annum.

4. THIRD ASSISTANT ENGINEER

Applicants should be experienced in the construction of sub-stations, h.v. and l.v., o.h. and underground mains, and be graduates of the I.E.E. or possess equivalent qualifications.

Salary, N.J.B. Agreement, Schedule "A" Grade 10, Class "G," £588-£610 per annum.

5. ENGINEERING DRAUGHTSMAN

Applicants should be experienced draughtsmen, capable of producing working drawings under supervision. Experience in electrical engineering will be an advantage.

Salary, N.J.B. Agreement, Schedule "D," Grade 6, £413-£547 per annum according to qualifications and experience.

Forms of application may be obtained from the undersigned or any other Sub-Area Manager and should be returned to me duly completed with any additional information not later than November 3, 1952.

A. E. ROOTS,
Manager.

Greenholm Street,
Kilmarnock.
October 15, 1952. (B 382)

SOUTH EASTERN ELECTRICITY BOARD

GENERAL ASSISTANT DISTRICT ENGINEER
Swale District

SALARY: £443 to £457 p.a. under N.J.B. D.12. Superannuable. Applicants should be qualified and have experience in all types of rural and urban distribution work up to 11 kV. A knowledge of d.c. networks including maintenance of rectifier substations, together with d.c./a.c. changeover work an advantage.

Applications, giving two referees, must reach F. E. Fairbank, A.I.E.E., Swale District Manager, SEEBoard, 88a High Street, Sittingbourne, Kent, by November 3, 1952.

ENGINEERING DRAUGHTSMAN
Surrey Sub-Area Engineering Department, Dorking

Salary within the range £413 to £547 under Schedule "D", Grade 6 of the N.J.B. Agreement. Superannuable. Duties include detailed layout of indoor and outdoor substations, together with switch and control gear wiring diagrams and general network diagrams and plans.

Applications on forms obtainable from District Managers or Senior Officers, and giving two referees, must reach C. W. Hughes, B.Sc., M.I.E.E., Surrey Manager, SEEBoard, Rough Rew, Horsham Road, Dorking, by November 3, 1952.

A. L. BURNELL,
Secretary.

October, 1952. (B 386)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

KINGSTON "B" POWER STATION. SHIFT CHARGE ENGINEER. Experience essential in the administration and operation of a power station operating at high pressure and temperature and in the operation of E.H.T. switchgear. N.J.B. conditions, Class "G" Grade 7, £739 4s. p.a., including London Allowance.—Apply by November 3, 1952, on forms obtainable from Station Superintendent, Kingston "B" Power Station, Downhall Road, Kingston-on-Thames. (B 357)

GOVERNMENT OF KUWAIT

DIESEL POWER STATION SHIFT ENGINEERS required for service with the Government of Kuwait, Persian Gulf. Applicants should have some technical qualification and should not be more than 35 years of age. They should have good experience in the operation and maintenance of diesel engines and generators, and also have sufficient electrical knowledge of an A.C. distribution system to be able to operate the power plant in the station efficiently. Steam power plant operation experience would be advantageous, as at a later date a steam power station will be operating and a transfer of the services of the diesel power station shift engineers to the steam station might be arranged.

Commencing consolidated salary offered is at the rate of £1,500 per annum, according to experience. Free furnished quarters and free medical attention are provided. The first year will be probationary, and if satisfactory, home leave will be granted at the end of three complete years service. Married accommodation cannot be promised within one year.

Applications in writing, giving full particulars of training, qualifications and experience, should be addressed to the Secretary, Ewbank and Partners, Ltd., 10-11 Grosvenor Place, London, S.W.1. (B 381)

NORTH EASTERN ELECTRICITY BOARD

York Sub-Area

APPLICATIONS are invited for the appointment of SECOND ASSISTANT DISTRICT ENGINEER, Whitby District. Applicants should have had sound technical and practical training and experience of constructions, operation and maintenance of underground and overhead h.v. and l.v. networks.

Salary (Schedule "A", Class "B", Grade 7, £539 to £566) and conditions of service in accordance with N.J.B. agreement.

Applications, stating age, qualifications and experience should be forwarded to the Secretary (Establishments), The North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne, within 10 days of the appearance of this advertisement. (B 385)

SOUTHERN ELECTRICITY BOARD

ASSISTANT ENGINEER
(MAINTENANCE AND OPERATION)

EALING District of No. 1 (Southall) Sub-Area. Salary, N.J.B., Class "F," Grade 8, Column 1 (£615 plus 5% London weighting). N.J.B. conditions of service.

Applicants should have experience in design, construction, operation and maintenance of h.v. and l.v. underground distribution systems, sub-station plant and distribution equipment, and possess suitable technical qualifications.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, 2-6 Windmill Lane, Southall, Middx., and returned to him in envelopes suitably endorsed, not later than November 3, 1952.

F. W. KEMPTON,
Secretary.

October 23, 1952. (B 384)

AN ASSISTANT ELECTRICAL ENGINEER (age group 25-32) is required by the south-west Lancashire factory of a large industrial organisation. University degree or equivalent qualifications with experience of industrial installations and maintenance of electrical equipment are essential.—Application (in writing), giving full particulars of age, training, and experience, to be addressed to Box No. 2125, Electrical Times. (B 388)

APPLICATIONS are invited for the following posts for factory maintenance and installation works for well-known cattle food manufacturers in the Kings Cross district.

(a) ELECTRICIAN, Working Chargehand. Experience must cover a.c. motors and starters from ¼ h.p. to 100 h.p., factory and office lighting and all normal wiring installations.

(b) MILLWRIGHT, Working Chargehand. Experience must cover equipment similar to grinding mills, elevators, conveyors, hoists and associated plant with electric motor drives as above and small boiler plant.

Ages not under 30 years. Positions are permanent after six months probationary period. Canteen facilities. Apply by letter stating age and experience to Box No. 2121, Electrical Times. (B 368)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

ASSISTANT DISTRICT ENGINEER, Class "E" Grade 9, £567 to £579 for a rural area based on Cuper, Fife.—Applications stating age, experience and technical qualifications to Manager, Fife Sub-Area, South East Scotland Electricity Board, East Port, Dunfermline, Fife, on or before October 31, 1952 (B 361)

ASSISTANT ELECTRICAL ENGINEER required by engineering firm. Duties will embrace all aspects of supply and installation of electrical equipment in steel works and glass works. Good theoretical knowledge of d.c. and a.c. motors and automatic control schemes desirable. Permanent progressive position for keen man. Pension scheme.—Apply, stating salary required and brief details of experience to Stein and Atkinson, Ltd., 25 Wilton Road, Westminster, London S.W.1, endorsed "Electrical Engineer". (B 369)

CHIEF ELECTRICIAN. Experienced man required for the post of chief electrician at a gold mine in Tanganyika, capable of organising installation and maintenance of heavy industrial electrical plant. Good knowledge of large synchronous motors, transformers, etc., generating plant with associated switchgear and protective equipment, overhead line and underground cable fault location, etc. Capable of organising, controlling, and training unskilled native labour. Salary £80 per month, 30 months' contract, satisfactory man may be re-engaged on pensionable basis after first contract. Free house and light, passages out and home with generous leave provisions. Good climate.—Write, giving full particulars and copies of testimonials, to Box "M.A.," c/o J. W. Vickers and Co. Ltd., 7-8 Great Winchester Street, London E.C.2. (B 399)

DRAUGHTSMEN AND JUNIOR ENGINEERS, preferably with Motor Control Gear experience. Temporary subsistence allowance and removal expenses paid. Staff pension scheme.—Apply, with full particulars, Personnel Manager, Brookhirst Switchgear, Ltd., Northgate Works, Chester. (B 390)

DRAUGHTSMEN required, preferably with experience in any of the following: Design of circuit breakers and metalclad switchgear, industrial control gear, switch and control board layout, l.t. ironclad switchgear, diagrams of connections. Applications from good mechanical draughtsmen are also invited. Good remuneration for experienced men.—Apply, quoting "Switchgear," stating age, experience and salary required to Staff Manager, General Electric Co., Ltd., Witton, Birmingham 6. (B 316)

ELECTRICAL FITTER for substation construction and maintenance work required in the Stevenage district of the Northmet Sub-Area. Conditions of service and rates of pay will be in accordance with the N.J.I.C. Agreement. The successful applicant, if residing within the greater London area should be able to obtain a house in the Stevenage new town within a few months of taking up the appointment.—Applications, stating age, experience and present appointment, should be forwarded within 14 days of the appearance of this advertisement to the District Manager, Eastern Electricity Board, Northmet Sub-Area, 38 High Street, Stevenage, Herts. (B 366)

ELECTRICAL REPRESENTATIVE required by old-established manufacturers and factors for West Riding of Yorkshire to cover established connection. Sales to all sections of trade, all electrical supplies, appliances and lighting fittings.—Application to state age, experience and salary required, details in strictest confidence. Closing date for applications October 31.—Box No. 2123, Electrical Times. (B 373)

ELECTRICIAN wanted for gold mine Tanganyika. Fully indentured apprenticeship, experience in heavy industrial electrical plant installation and maintenance essential. Knowledge of mining electrical plant an advantage. Salary £60 per month, 30 months contract, satisfactory man may be re-engaged on pensionable basis after first contract. Free living accommodation, passages out and home with generous leave provisions. Good climate.—Write giving full particulars and copies of testimonials to Box "O.O" c/o J. W. Vickers and Co., Ltd., 7/8 Great Winchester Street, London, E.C.2. (B 400)

ENGINEER or PHYSICIST with Higher National Certificate or a degree is required for design work for small quantities of special transformers for experimental apparatus.—Apply, stating age and record, to the Staff Manager (Ref. SS/NB.2), G.E.C. Stanmore Laboratories, The Grove, Stanmore Common, Stanmore, Middlesex. (B 398)

ELECTRICAL LAYOUT DRAUGHTSMAN required, preferably with experience in layout of switchgear and transformers for power stations and also outdoor type high voltage substations.—Apply to Kennedy and Donkin, 12 Caxton Street, S.W.1. (B 367)

KELLOGG INTERNATIONAL CORPORATION require for design engineering office in London: (a) PIPING DESIGNER-DRAUGHTSMAN with O.N.C. or H.N.C. (mechanical engineering) and experience of piping layout design in oil refinery or associated fields; (b) ELECTRICAL DESIGNER-DRAUGHTSMAN with O.N.C. or H.N.C. or equivalent in electrical engineering and at least two years experience on power and lighting distribution in refinery, power supply and associated fields. Both these appointments are permanent and offer opportunity in an expanding industrial field.—Apply in writing, giving full details of qualifications and experience to Personnel Manager, 7-8, Chandos Street, London, W.1. (B 409)

METER MANUFACTURER, N.W. London, invites applications for PROGRESSIVE POSTS in their Test depts. Applicants should have experience in Class "A" Test Station procedure and have an education equivalent to O.N.C. standard.—Full particulars with salary required to Box No. 2099, Electrical Times. (B 317)

OVERHEAD LINE ENGINEERS required by consulting engineers for work in the North of Scotland and the outer islands. Applicants should have received a suitable technical education and also be experienced in the construction of (a) steel tower transmission lines, or (b) h.v. and l.v. overhead distribution networks.—Applications, stating age, qualifications and experience, should be sent to Messrs. Kennedy and Donkin, 3 North Charlotte Street, Edinburgh. (B 391)

STOREKEEPER for West End electrical contractors; able to check and keep stock.—Write Box No. 2119, Electrical Times. (B 364)

TELEVISION TECHNICAL PUBLICATIONS AUTHOR Applications are invited by a well-known manufacturing company for the above position which will include the writing of service manuals, instruction books. The successful applicant will be required to reside in or near Liverpool.—Reply stating qualifications with full details of past and present employment quoting reference AJBI to Box 2117, Electrical Times. (B 363)

TRACTION SUPERINTENDENT required by Crompton Parkinson Limited, Chelmsford, to take charge of the production of railway, trolleybus and tramway motors, diesel electrical equipment, etc.—Applicants, who must have had extensive experience in this class of work, should write giving age, full details of training and experience to General Manager. (B 365)

TRANSFORMER DRAUGHTSMAN, used to Services requirements, able to work on own initiative mainly on small units.—Write stating experience and wages required, Pearce Transformer Co., Ltd., New Cross Rd., London S.E.14. (B 397)

TRANSFORMER SALES and CONTRACTS ENGINEERS required immediately in a modern electrical appliance works in Liverpool for men with H.N.C. in electrical engineering. Applicants must have served a full working apprenticeship and have had experience of this type of work. The position is pensionable after a probationary period.—Write stating experience and present occupation to Box 2115, Electrical Times, quoting reference HIH. (B 362)

POWER PLANT SHIFT CHARGE ENGINEER

required by

THE STEEL COMPANY OF WALES LIMITED

APPLICANTS should have served a recognised apprenticeship with a major engineering company, and have a sound general and technical education.

Experience in the following is desirable:—

(a) As Shift Charge Engineer.
(b) High pressure boiler and turbine operation.
(c) Operational control of an interconnected h.t. industrial network.
(d) Other works auxiliary services.

Salary according to age and experience. The post will be permanent and pensionable on satisfactory service.

Applications, in own handwriting, should be addressed to:—

The Personnel Superintendent,
THE STEEL COMPANY OF WALES LIMITED
Box No. 3,
PORT TALBOT (B 351p)

WANTED by large British Company in Spain, ASSISTANT ELECTRICAL ENGINEER for the supervision and maintenance of heavy electrical plant. Candidates must have served a full apprenticeship with a high grade British firm and it is desirable that they should be A.M.I.E.E. or similarly qualified. Commencing salary according to qualifications and experience.—Write stating age, whether married or single, number of children. Replies should also give full details of training and experience and must state present salary.—Box M.191 c/o Streets, 110 Old Broad Street, London, E.C.2. (B 401)

WANTED. ELECTRICAL ESTIMATORS used to internal, underground and overhead installations. Would consider juniors to train if otherwise suitable.—Apply: B. French Ltd., Pike Mills, Green Street, Kidderminster. (B 292)

WORKS MANAGER required for important factory manufacturing power transformers up to largest capacity and highest voltage.—Applicants should give full personal details, stating experience and salary required to Box No. 2127, Electrical Times. (B 389)

APPOINTMENTS WANTED

ELECTRICAL ENGINEER (27), A.R.T.C.S., H.N.C., heavy and electronics, seeks technical representative. Experience contracting, maintenance and commercial.—Box No. 2129, Electrical Times. (B 392)

ELECTRICIAN (27), experienced in Domestic and Industrial installations, seeks progressive position. Would welcome any opportunity of gaining knowledge in electronics.—Box No. 2075, Electrical Times. (B 255)

MECHANICAL/ELECTRICAL ENGINEER, A.M.I.E.E., aged 49, seeks situation in U.K. Electrical construction and maintenance; operation and maintenance of large diesel-alternator sets; extensive practical mechanical workshop experience.—Box No. 2087, Electrical Times. (B 280)

WORK WANTED

A. C. and d.c. MOTOR REWINDS and REPAIRS. Prompt service, fully guaranteed. Edgware 5566 (4 lines). —Service Electric Co. Ltd., Stanmore, Middx. (A 19)

BRASS LIGHTING FITTINGS cleaned and gilded. Crystal chandeliers repaired and cleaned. Outside lanterns gilded and waterproofed.—Arts and Antiques, 49 Berwick Street, London W.1. (B 393)

CASTINGS. Fisher Foundries Ltd., Greet, Birmingham, have capacity for brass, gunmetal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (A 647)

ELECTRIC motors, stators, etc., REPAIRED AND REWOUND. Vacuum cleaner and electric tools rewound. Seven-day service.—The Motor Winding Co., 18 Gipsy Hill, London S.E.19 (Gipsy Hill 0354). (B 321)

MOTOR GENERATOR SETS built to customers' requirements from new and/or modern reconditioned machines. Guaranteed for twelve months. Good deliveries, competitive prices.—Enquiries to Thos. W. Ward, Ltd., Albion Works, Sheffield. Tel. 26311 (Ext. 347). (B 402)

PRESSINGS. Assemblies, wire work, spot and arc welding, capstan work. Quick service. Large quantities material available. Quotations by return. Specialists in sub-contract work.—Mountsorrel Pressings, 20 Loughborough Road, Mountsorrel. (B 273)

WANTED

A.C.-D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co. Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (A 11)

WANTED. A 500 kVA OIL-COOLED TRANSFORMER to BSS. 171/1936. High volts, 6,600; low volts, 400; 50 cycles.—Box No. 2089, Electrical Times. (B 293)

WANTED. D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co. Ltd., 22-26 Britannia Walk, London N.1. (A 7)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath, Staffs. (A 3)

WANTED. MERCURY ARC RECTIFIER, 100-kW OUTPUT AT 230 V D.C. FROM A 400/3/50 INPUT SUPPLY —DETAILS TO JOHN RIGBY AND SONS, RAWFOLDS, CLECKHEATON. (B 370)

WANTED, ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 9)

AGENCIES

FLUORESCENT TUBE refilling specialists require AGENTS in all areas excepting London and Lancs. Must have facilities for the storing and distribution of tubes.—Box No. 2131, Electrical Times. (B 396)

FOR SALE

AUCTION

E R

By order of the Secretary of State for Air.

AUCTION SALE

For No. 14 M.U., R.A.F., Carlisle. No. 7 Site, Blackwood, Longtown, 9 miles north of Carlisle.
Friday, October 31, 1952, at 11 a.m.
Sale held in the
COUNTY HALL, CARLISLE
top of Botchergate.

ELECTRICAL AND INDUSTRIAL MACHINERY AND SUNDRIES

including petrol electric charging sets, generators, motors, dynamos, compressor sets, power units, panels, transformers, meters, projectors, receivers, jacks, metal tubing, oilskins and tarpaulins, cases and sundries. Viewing on sites, Thursday, October 30, 9 to 12 and 1 to 4.30 p.m.; and on sale morning to 11 a.m. Catalogue 6d., admits two to viewing, one only to sale.

Auctioneers:

HARRISON & HETHERINGTON, LTD.,
Carlisle.
Tel. 1792-3. Telegrams: "Sales". (B 371)

CABLES & WIRE

QUANTITY of 7·029 with earth T.R.S. CABLES for sale at approx. 25% below trade price. First-class makes. —Hayes, 81b, Stoke Newington Rd., London N.16. (B 406)

UNDERGROUND CABLES in full drum lengths and short cuttings, all sizes and voltages for disposal. —Apply, Box No. 2107, Electrical Times. (B 343)

60,000 YARDS 7·044 twin P.V.C.—Box No. 2133, Electrical Times. (B 410)

DOMESTIC APPLIANCES

GRUBB IMMERSION HEATERS. The new 7 kW model. No purchase tax. Provision for intermediate loadings as required. All lengths 16 in. to 30 in. Immediate delivery.—Write for particulars and terms to distributors, John Owner and Co. Ltd., Springfield Road, Birmingham 13. Tel.: Springfield 2939. (B 25)

ENGINEERING PLANT & MATERIALS

ALUMINIUM ALLOY, new flat sheets, 6 ft by 3 ft 24 gauge. 6 tons from 22/6 per sheet, 1 ton or more 2/9 per lb., carriage paid or delivered ex stock.—D. McMaster & Co., Ltd., Bures, Suffolk. Tel.: Bures 351/2. (B 62)

ANGLE, 14,000 ft ¾ in. x ¾ in. x 12G. x 15 ft long Bright Cold Rolled Mild Steel (new), 29/10d. per 100 ft or very near offer, plus carriage.—Medgar, Ltd., Warnford Road, Bournemouth. (B 407)

750,000

NEW BALL RACES ROLLER, THRUST AND TIMKEN RACES IN STOCK. STOCK LISTS AVAILABLE.

CLAUDE RYE BEARINGS

895-921 Fulham Road, London, S.W.6
RENown 6174 (20 lines) (B 274p)

NEW Q. and S. TOGGLE PRESSES from stock: 1 ton £30 each. Also, DRILLING-TAPPING M/C, various makes, new only.—Production Promotion, 94 Camden Road, London N.W.1 (Tel. GUL. 6006). (B 394)

200 1¼-in. NIPPLES, Simplex Ref. 2275. 125 COUPLERS, 1¼-in., Simplex Ref. 2086. 420 INSPECTION TEES, 1¼-in., Simplex Ref. 2125. 600 BRASS BUSHES, 1¼-in., Simplex Ref. 96. 200 MALE BUSHES, 1¼-in., Simplex Ref. 86. 500 brass 1-in. ADAPTORS for flexible conduit. 100 PLUGS, 1-in., Simplex Ref. 2654. All the above are screwed or tapped electrical thread, and are in new condition, as delivered from the original manufacturers—Simplex Electric—and are surplus to our present requirements. Derby Aviation, Burnaston, Derby. (B 294)

GENERATING PLANT

DIESEL ALTERNATOR SETS in stock up to 500 kVA, 400/440 V, 3-phase, 50 c/s, 4-wire. Detailed stock list post free on request.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Tel.: 26311 (Ext. 347). (B 403)

DIESEL-DRIVEN GENERATOR SETS. Two 200-kW, ea. incorporating 330-h.p. Crossley vert., 6-cyl., 4-stroke diesel engine, Type XVD6; speed 600 r.p.m.; direct coupled 200-kW, 225 V Crompton Parkinson d.c. generator; compound wound with interpoles. Usual accessories, also heat exchanger for external salt water cooling, air starting equipment and switchboards.

Three 150-kW ea. incorporating 240-h.p. Belliss and Morcom vert., 6-cyl., 4-stroke diesel engine, Type 5A; speed 600 r.p.m.; direct coupled 150-kW 220-230 V G.E.C. d.c. generator, compound, wound with interpoles. Standard accessories, also starting equipment, and switchboards.

150-kW, incorporating 240-h.p. National vert., 6-cyl., 4-stroke diesel engine, Type RA.6; speed 600 r.p.m.; direct coupled 150-kW 220-230 V Crompton Parkinson d.c. generator, compound wound with interpoles. Standard accessories, also starting equipment and switchboard.

George Cohen Sons and Co., Ltd., Wood Lane, London W.12. Tel.: Shepherds Bush 2070 and Stanningley, nr. Leeds. Tel.: Pudsey 2241. (B 372)

GENERATING SETS FOR SALE. Large quantity of petrol-driven sets available, various types and sizes, all voltages a.c. and d.c.—Further details from Uniproducts (Manchester), Ltd., 142 Bolton Road, Pendleton, Salford 6 (Phone Pendleton 1341). (B 395)

OFFERS Wanted for Diesel Alternator Set, comprising two 75-b.h.p. Leyland Diesels, 45-kVA, G.E.C. Alternator, complete with frame, V drive. Battery Charger and all accessories.—Batley Carr Woollen Co., Ltd., Perseverance Mills, Carr-Street, Batley Carr, Dewsbury. (B 408)

ONE 50 kVA GENERATING PLANT for sale, complete, consisting of brand-new Alpha Harris alternator, 400/3/50, 4-wire, driven by Leyland 6-cyl. Diesel engine. Can be seen running by appointment.—Stead and Brooke Ltd., Springhead, Oldham. Tel.: Main Oldham 1770. (B 297)

27½-kVA Perkins P.6/MacFarlane ALTERNATOR SET. Almost as new. 400/230 V, 3-phase, 50-cycle, 4-wire, A.V.C. unit construction with switchgear, etc.; also two new 60 amp. 4-pole changeover switches.—Kellett and Pick Ltd., Northallerton. Tel.: 78. (B 281)

LIGHTING EQUIPMENT

FLUORESCENT FITTINGS complete with all control gear. Finished hard gloss white stove enamel. Fully guaranteed two years. 5 ft. Hexagon Batten S.B.5, 57s. 6d., 5 ft. Industrial Trough T.M.5, 63s., 4 ft. Slim Batten C.H.4, 48s. 6d. Also 2 ft. and 3 ft. All prices ex-works. Illustrated catalogue and price list on request.—M.E.S., Ltd., 117 Hornsey Road, N.7. NORth 4923. (B 96)

PURLEY CHOKES AND BALLASTS. Our 80 W Tapped h.p.f. ballast, with starter switchgear-holder incorporated, is proving itself the most popular unit. Suitable for most fittings. 57s. 6d. each, subject.—F. W. Blanshard Ltd. (Dept. ET), Purley, Surrey. Uplands 4818-9. (A 20)

METERS

A.C./D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, N.W.4. (A 8)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (A 14)

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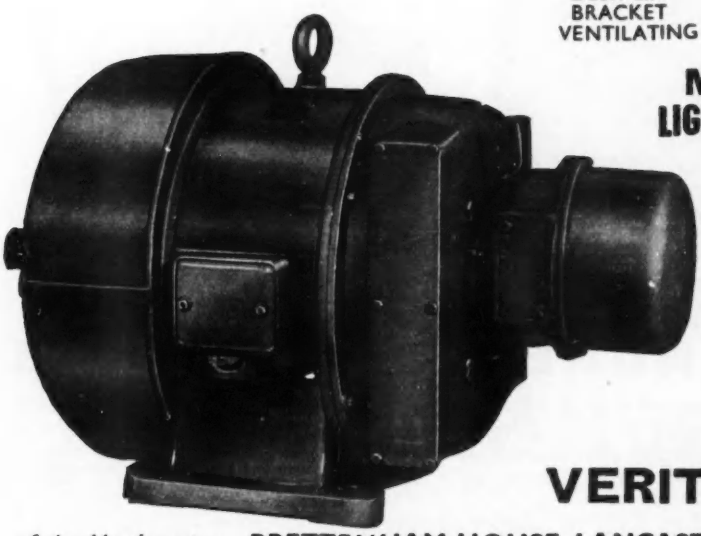

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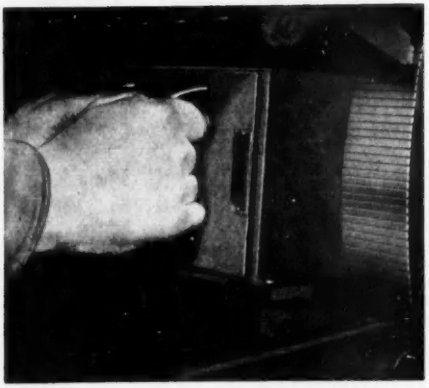

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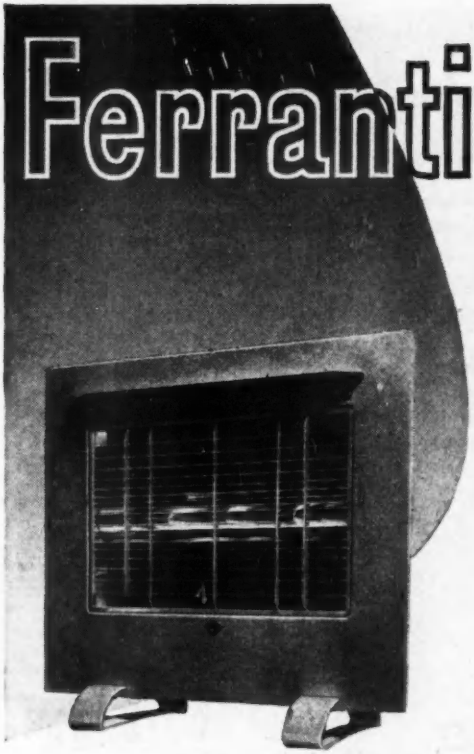

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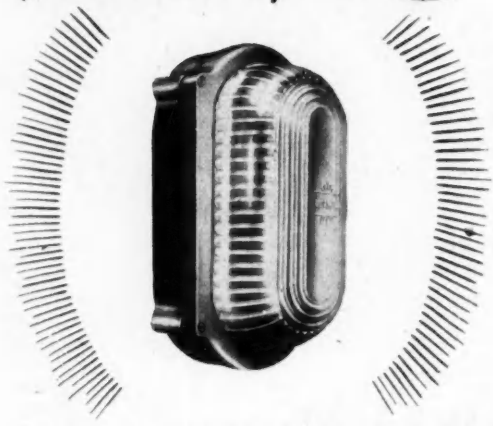

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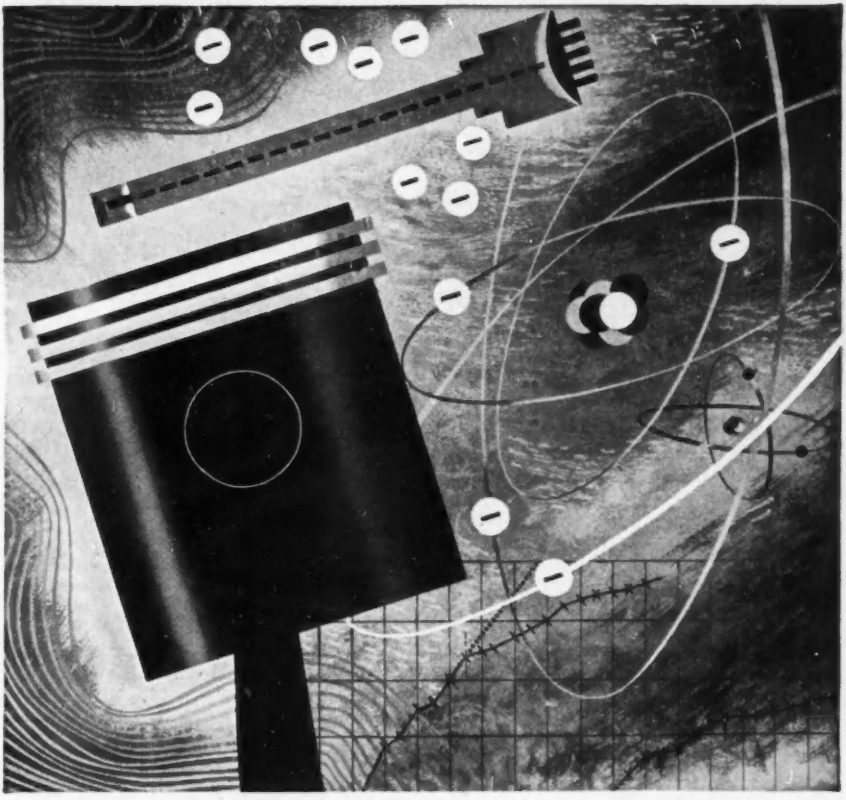

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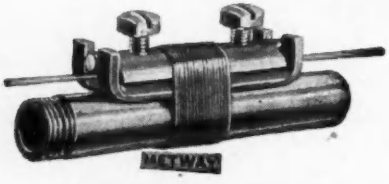

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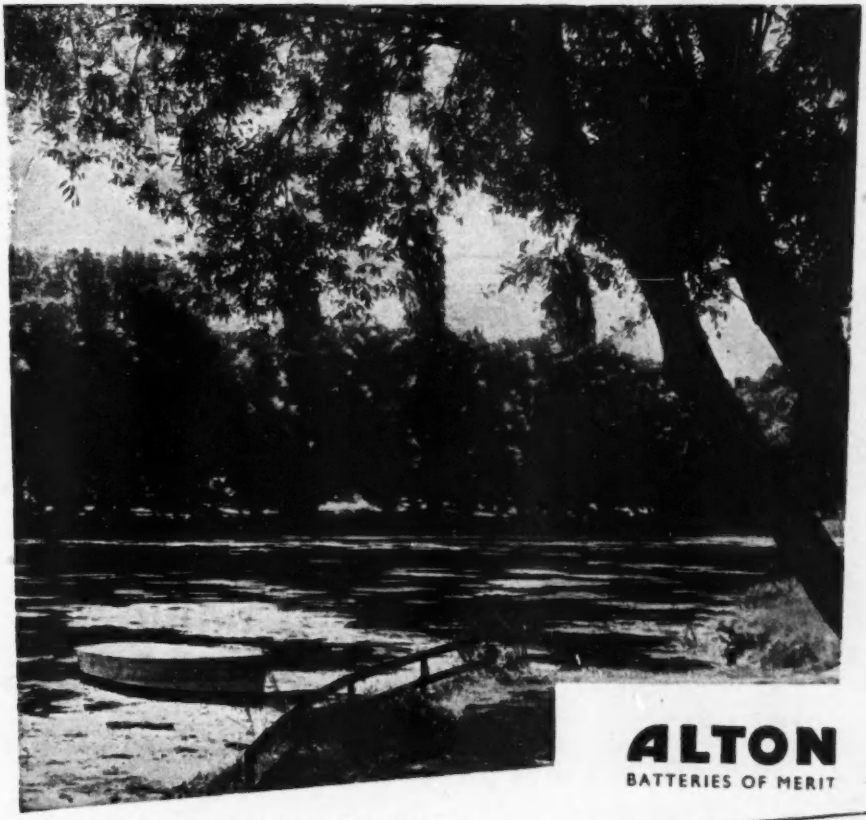

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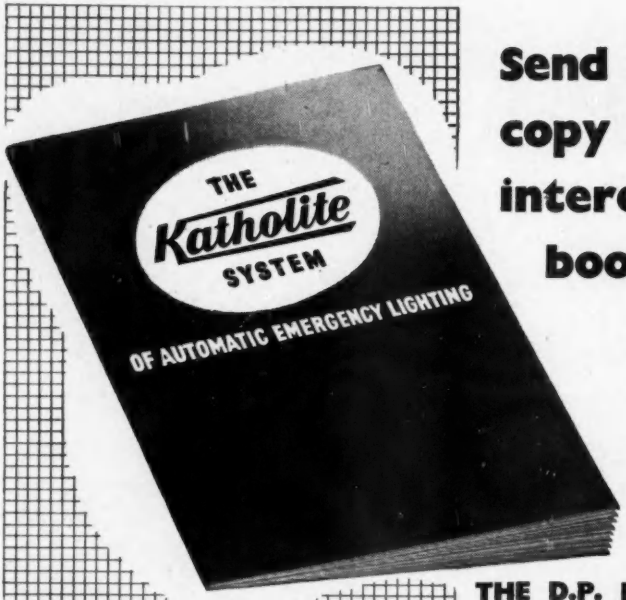

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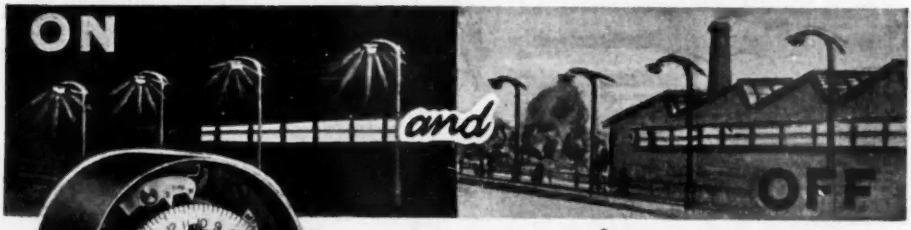

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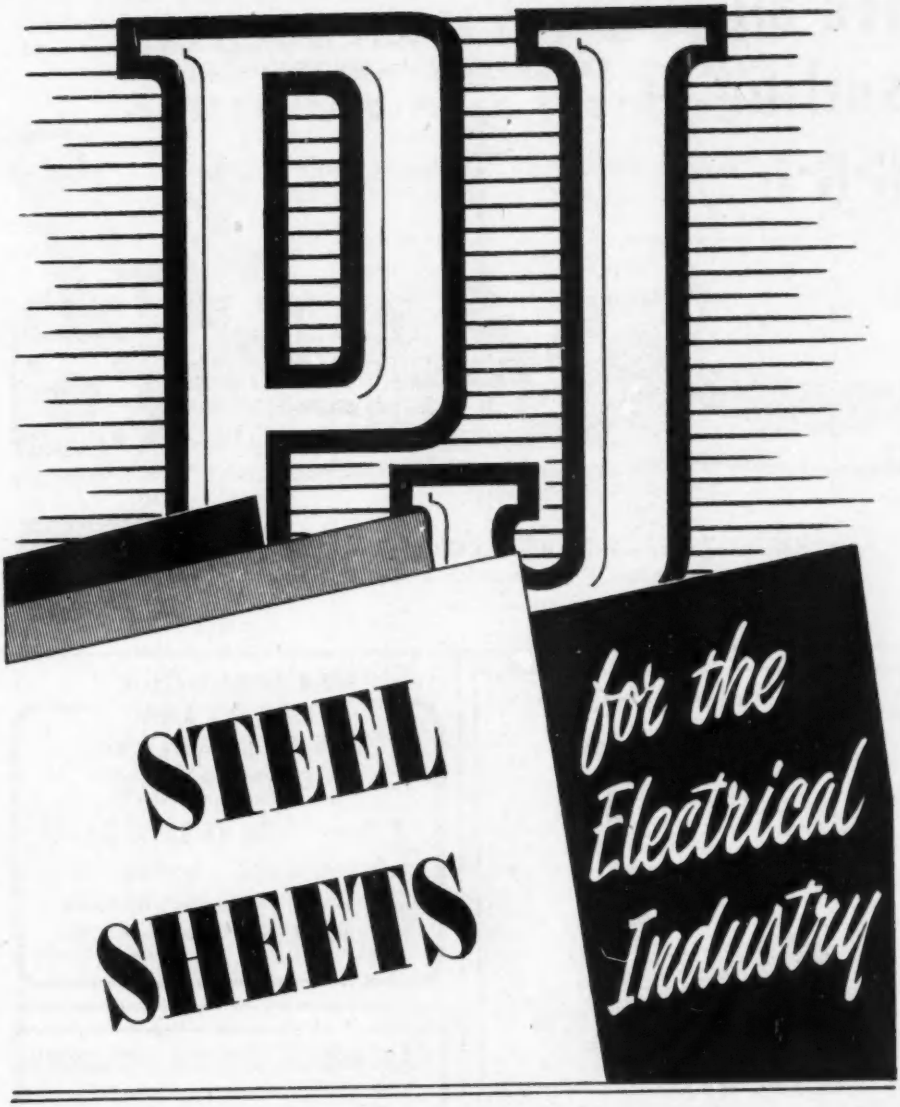

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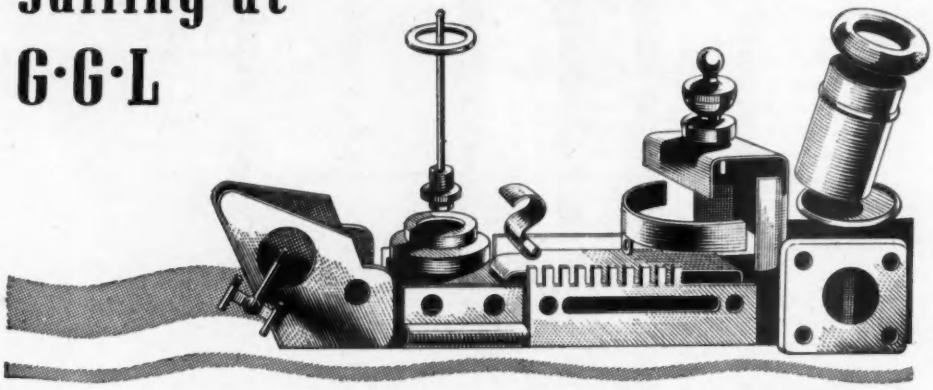

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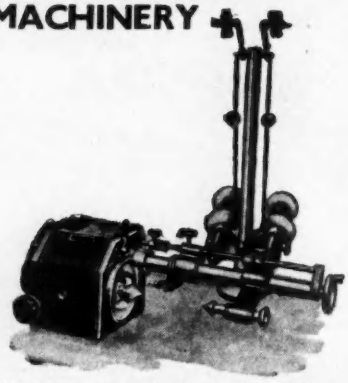

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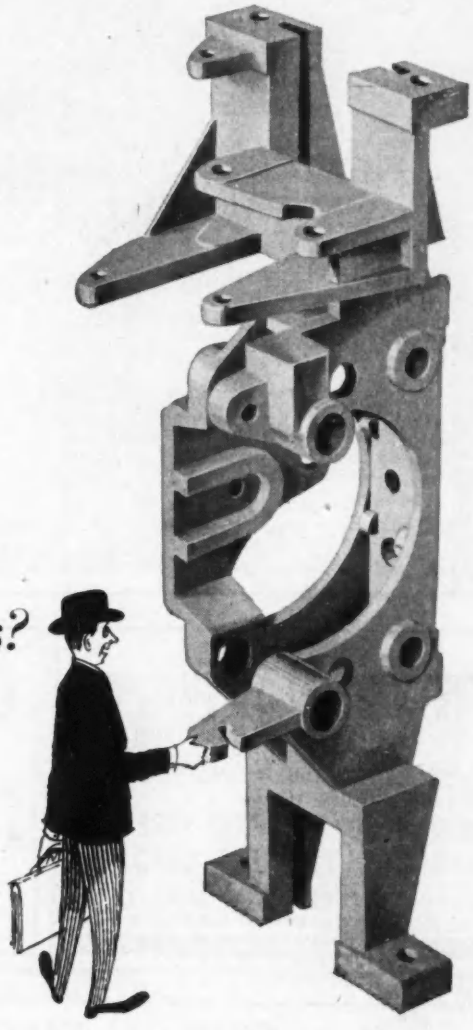

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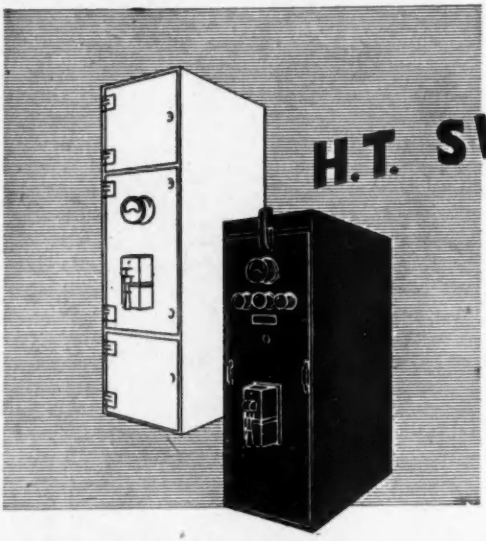

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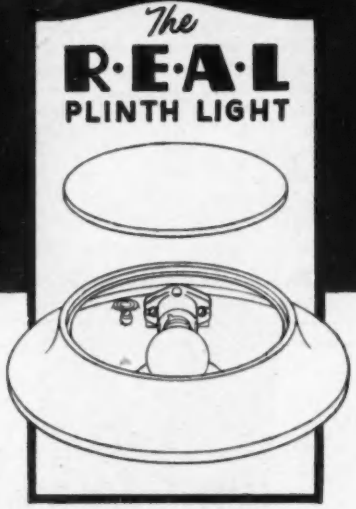

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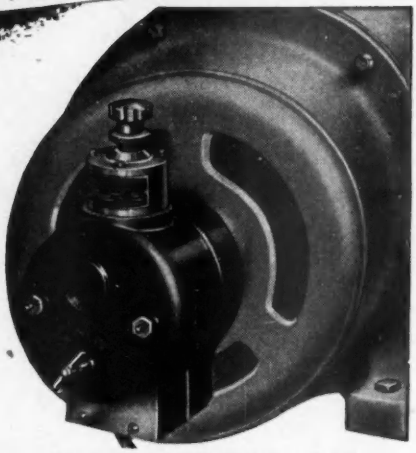

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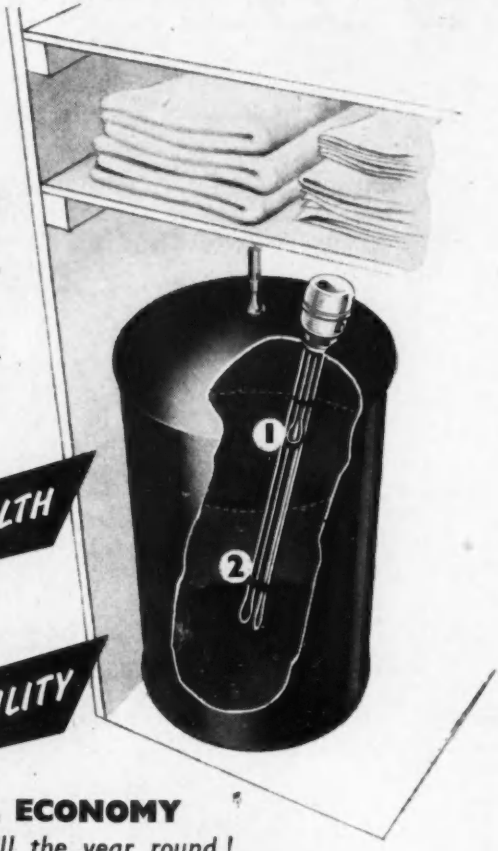

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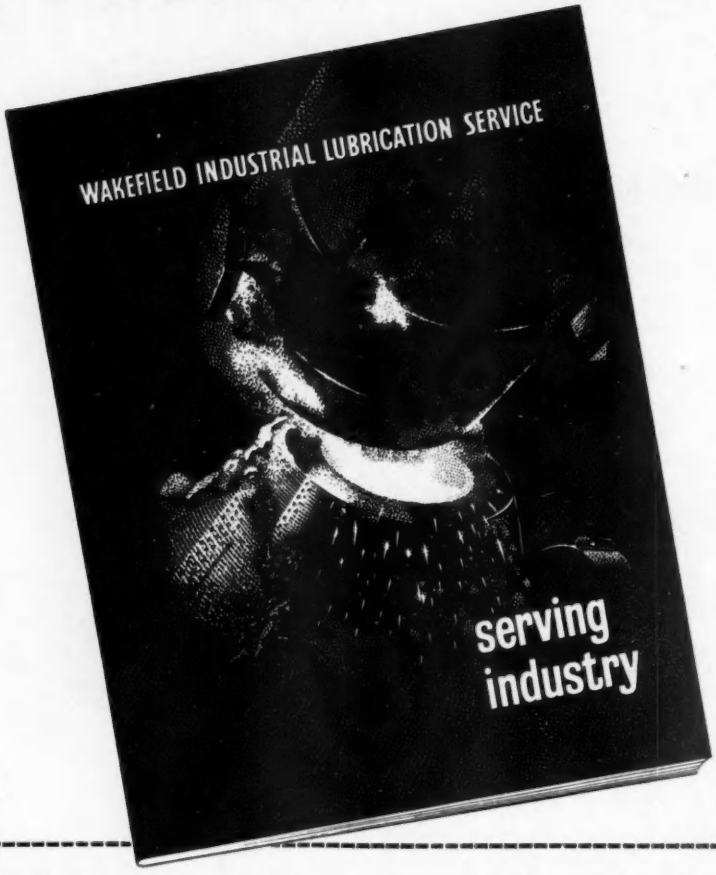

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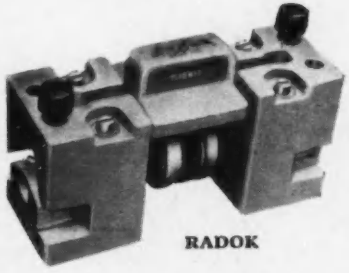

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